THE ALL-IN-ONE CAMERA-BOOK

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THE ALL-IN-ONE CAMERA-BOOK

The Easy Path to Good Photography

By W. D. EMANUEL

Twenty Eighth Edition

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PARTNERS INTRODUCE THEMSELVES

A brief description of some very important objects

ESSENTIALS OF EVERY CAMERA

I am the Lens

My family goes back to the year 1000 A.D

My ancestor was a glass bottle filled with water The historians say that even in those far-off days people had noticed that an image of the world was formed by the sun s rays streaming through the water in the bottle True this image is upside down but everything is there all right the brightly lit window frame the blue sky the trees and the houses on the other side of the street And if somebody stands at the window and waves his or her image and gesture will be faithfully recorded

But the image thrown by the bottle is very imperfect the details are somewhat blurred So clever men set to work and made countless experiments and horribly com *plicated calculations until at last they invented me*

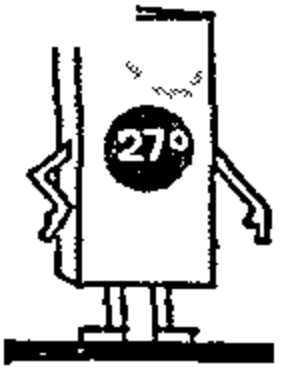
Being composed of a number of carefully ground lenses stuck together each lens made of a different kind of glass I am able to produce a faultless image I take the disorderly mass of light rays as they come rushing through me the glare from the near by roof mixed higgledy piggledy with the distant blue of the sky and the rays from the wood in the near distance and I put them all in their proper place until they form a clear bright image of the outside world

If the objects I have to reproduce are a long way away their sharp outline will appear 2 or 3 or 4 inches behind me according to my *focal length* as it is called The nearer the

objects come towards me, the further their images retreat. True, this is only a question of millimetres and fractions of millimetres. But if you want me to produce a sharp picture you must be careful to catch the image at exactly the right spot. You must focus your camera. If you don't, you will get a blurred picture, and it's no use blaming me for it.

There are cameras which make it very easy to get the right focus. Those reflex cameras, as they are called, are fitted with a ground-glass screen on which you can see the picture and on which you can focus it sharply. There are also automatic focusing cameras which are fitted with a complicated mechanism for measuring distances. These, too, ensure a sharp image of the object

I am the Film



I have an extremely sensitive skin compared to which the delicate epidermis of a young girl is like the toughest pigskin. A few fleeting beams of daylight are enough to make me sunburnt. That is why I am always packed in a light-tight box. My skin must only come into contact with the air in the dark interior of the camera. Photographers—cunning fellows—exploit my peculiarities in order to capture the fleeting image of the outside world cast upon my skin by the lens of their camera.

If this picture does not come out so well as the man with the camera hoped, I really cannot take the responsibility. I do my best and I know that the people in my birthplace,

the big film factory, took a tremendous amount of trouble and used the best scientific brains and instruments to endow me with the very best qualities

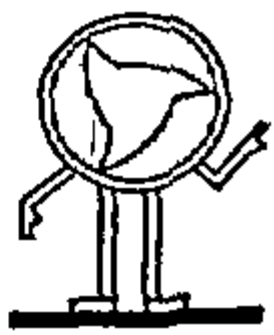
Above all I was given a certain degree of *sensitivity* expressed very accurately in Scheiner or Weston degrees and printed on my packet. There are films with 20 degrees Scheiner, others with 27 degrees Scheiner and 30 degrees Scheiner, the higher the figure the greater my sensitivity to light.

I have an elder sister, *Plate* Owing to my lighter weight, and all round handiness I am much more popular But still, there are people who swear by Plate, and I certainly will do nothing to turn them against the object of their admiration

And lately a baby has been born into our family, who, unlike Plate and I, who can only give black and white pictures is able to reproduce things in their natural colours

But for all three of us the greatest care must be taken to see that the image remains on our skin just long enough and not too long For our *emulsion* is highly sensitive to light. Otherwise one gets pictures which are either *under-exposed* or *over-exposed*

I am the Shutter



I am generally to be found between the lenses I decide whether the light is to pass into the camera and how long it is allowed to remain there. I act as door-keeper To

ensure rapid opening and closing of the door I am often provided with over a hundred beautifully-made metal parts.

I can move extremely fast, when necessary, for light rays are slippery customers They dash through the gateway at 186,000 miles per second If I were not snappy, one would have more light in the house than one could use, and the poor film's skin would be ruined

Some of my colleagues, who, as a matter of fact, do not look much like me, and who live further back in the interior of the camera, can bring off record speeds These *focal plane shutters*, as they are called, will give you an exposure of 1/1000 or 1/1250 second and even less, not once, but as often as you like Of course we can easily do the longer times, such as 1/50 or 1/25 second, and when required, can remain *open ten seconds, or ten minutes or ten hours if needs be*

If the object is brightly lit, I need let light in for a short time only, because it only requires the fraction of a second to work on the skin of the film But a dull image, such as is thrown by unfavourable lighting or from dark objects, has to remain longer on the film, in which case I must keep the door open longer

I am the Diaphragm

I am made of thin steel plates cunningly set in a metal ring If a certain lever is moved, my plates close in and the opening in the middle gets smaller and smaller, until it almost disappears If the lever is moved in the opposite

direction my plates open out and the aperture gets bigger So I may be considered as a hole, a circular nothing But all the same I am very cunningly built

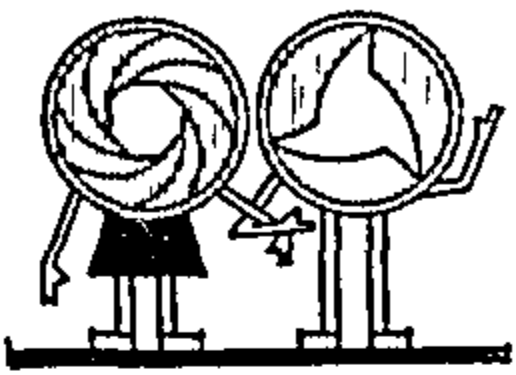
My place is in the empty space between the lenses, near the spot where the shutter is usually to be found When I am opened wide, a lot of light can get in, and the image within the camera is bright But if the steel plates close in, only a narrow bundle of rays can force its way through The image is the same size as it would be with a large aperture, but it remains dim and dull, because it is formed of so few rays of light

So I control the number of incoming rays The size of my aperture is expressed by certain numbers· 4, 5 6, 8, 11, and so on The smaller the number the larger the aperture of the diaphragm (and the brighter the image within the camera) *Aperture* (or *stop*) 2 indicates a wide opening, whereas 16 means a small aperture and a correspondingly dark image The stops most frequently used are the middle range 5 6, 8, 11

The numbers indicating the size of the aperture are so arranged that by moving the lever from one mark to the next higher one the brightness is halved—by moving to the next lower one the brightness is doubled

Strangely enough, the size of my aperture influences not only the picture's brightness but the sharpness of its details Even old hands at photography are sometimes ignorant of this fact If my aperture is kept small, all objects, whether near or far, are sharply reproduced If the size of my aperture is increased, the area of sharp definition shrinks and it continues to diminish proportionately as the steel plates open wider and wider With a very wide aperture such as 2, and with the camera focused at 3 to 6 feet, this *depth of field* is reduced to a couple of inches, so that it becomes difficult to get a person's nose and ears equally sharp—even though he may not be particularly thick-headed Fortunately one can generally use the smaller apertures covering a correspondingly greater depth

We Work Together



It is our job, Diaphragm and Shutter, to see to it that the film gets enough light and so we work peacefully hand in hand

If you want a picture with great depth of field, you must make my (the Diaphragm's) opening fairly small. That means that the image inside the camera will be very dark. This is where friend Shutter comes to the rescue in allowing the image to remain longer on the surface of the film, so that, despite its weakness, it succeeds nevertheless in leaving a satisfactory impression

In other cases the shutter must only remain open for a short time, so that quickly-moving objects can be snapped sharply. This means that the image remains for a short time, 1/100 second or less, on the film. Now I, the Diaphragm, must compensate for this by keeping my aperture wide. This gives a sharp picture although the light only remains on the film so fleetingly.

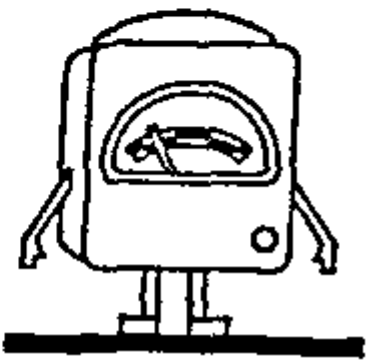
So it is rather like a see-saw; when one of us shoots up into the air, the other comes down with a bump Speed of shutter and size of aperture, therefore, are complementary and in inverse ratio to each other. If the light is poor, however, we must both of us go all out; I, the Diaphragm, must provide the widest possible opening, and friend Shutter must remain open a long time, so that our combined efforts overcome the unfavourable lighting conditions.

One thing must not be overlooked: before we share out the work, we must know how much light is necessary to get the picture on to the emulsion Sometimes the sky is

covered and at others the sun is shining and objects vary greatly in brightness The light that comes rushing towards the lens is, therefore, of different strength every time.

Hence the existence of exposure meters, which are experts in this business More accurately than the most practised eye, these instruments indicate the prevailing light conditions and so provide the necessary basis upon which we, Diaphragm and Shutter, can build

I am the Exposure Meter



I am a sort of miniature electricity works But whereas other electricity works use water-power or coal, I use light for the production of electric current. The amount of electricity I produce, however, is extremely small It would not work a light bulb or an electric iron, but it is quite sufficient to influence the needle of an extremely sensitive measuring apparatus A strong light makes the needle swing through a big arc. If the light is weak on the other hand, the needle only makes a faint movement. And on that depends my use for photography

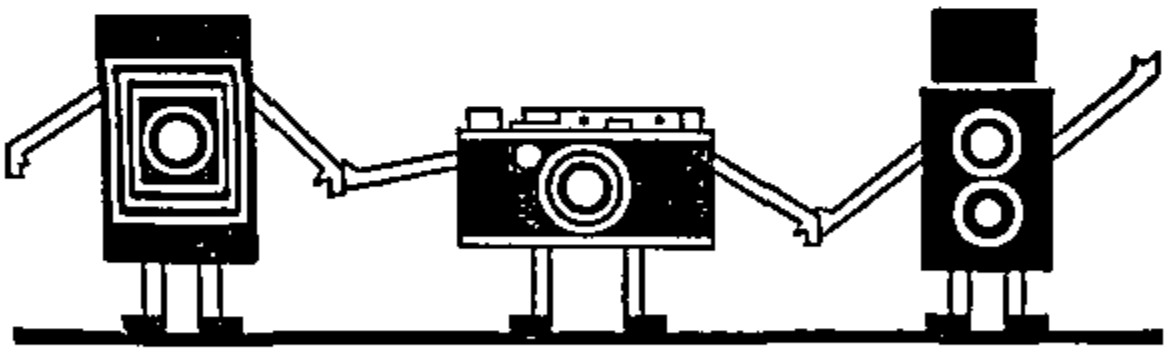
I measure the light which the various objects reflect, and indicate the correct exposure which will produce a clear image of these things on the film If I am aimed at a dark object, my pointer does not go much beyond the zero mark, and indicates 1/10 or 1/25 second, for example, as the length of exposure. When confronted by a bright, well lit object, however, the needle swings a long way round the scale and points to an exposure of, say, 1/100 or 1/250 second, which

means that the film need be exposed to the light only for this small fraction of a second Whether I work in a dark alley or in a sunny landscape, my needle gives reliable information

It then remains for the photographer to decide how he is going to divide the work to be done between the shutter and the diaphragm I am fitted with a small adjustable scale which will help him to do this

Besides *electric* meters, like myself, there are *optical* exposure meters which work on quite a different principle Now I do not wish to speak badly of my colleagues I admit that they are quite useful for work in a badly-lit room, when my needle is scarcely influenced by the extremely weak light But all the same I must say that in all other respects I am much more efficient For one thing, I work very quickly, whereas the optical meter demands a considerable amount of trouble if it is to give accurate and reliable results

And These Are Cameras



Those are the component parts, whose collaboration in the guise of a camera produces the photographic image It is said that any photograph can be taken with every camera That may be true, provided that you are not particular about the quality of the results you get

There is no all round camera which could be guaranteed to deliver nothing but the " best " snaps under all circumstances Every camera has its advantages and disadvantages

There is nothing simpler than a *box camera* It produces a sharp, precise picture and makes careful focusing unnecessary. But this advantage can also be a drawback, since both foreground and background are clearly defined, with the result that all objects, whatever their significance, are given equal importance. Another feature which is at the same time a convenience and a limitation in this type of camera is the simplicity of its shutter speeds, which makes it impossible to adapt the exposure to the movements of the subject Everything has been done for the man who just wants a souvenir and is too lazy to take the necessary trouble to get pictures of first-class quality

Folding cameras vary considerably, both as to their equipment and their quality The simplest kinds work just like a box, except that they can be folded, and take up less room But the most modern types, furnished with high-speed lenses, have shutters graded to the highest fractional speeds and a minute focusing mechanism, which is sometimes even coupled to an optical range-finder. As regards performance, they have much in common with the modern *miniature camera, except that they produce larger snaps,* and are, therefore, somewhat bulkier.

The plate-camera is built up on the same principles as the folding camera, with the one great difference that focusing is possible on a ground glass screen It has lost much of its former popularity even in quarter-plate size ($4\frac{1}{4} \times 3\frac{1}{4}$"= 8 2 × 10 8 cm), owing to the awkwardness of changing plates, and to its weight. But it is to be recommended to those people who like to take pictures in the old "pictorial" style.

The reflex-camera is the modern counterpart of the focusing-screen camera The plate is however, usually replaced by a film It has become much more handy, owing to the reduction of the negative-size ($2\frac{1}{4} \times 2\frac{1}{4}$"= 6 × 6 cm) If it has only one lens, and if this is of the interchangeable type, then it will be almost as versatile as a

rangefinder miniature camera If it has two lenses, you cannot get this versatility, but on the other hand you will be able to get something like the speeds of the miniature camera. The twin lens reflex camera may be said to be first favourite amongst those innumerable amateurs who like to be able to watch the picture on the ground-glass screen

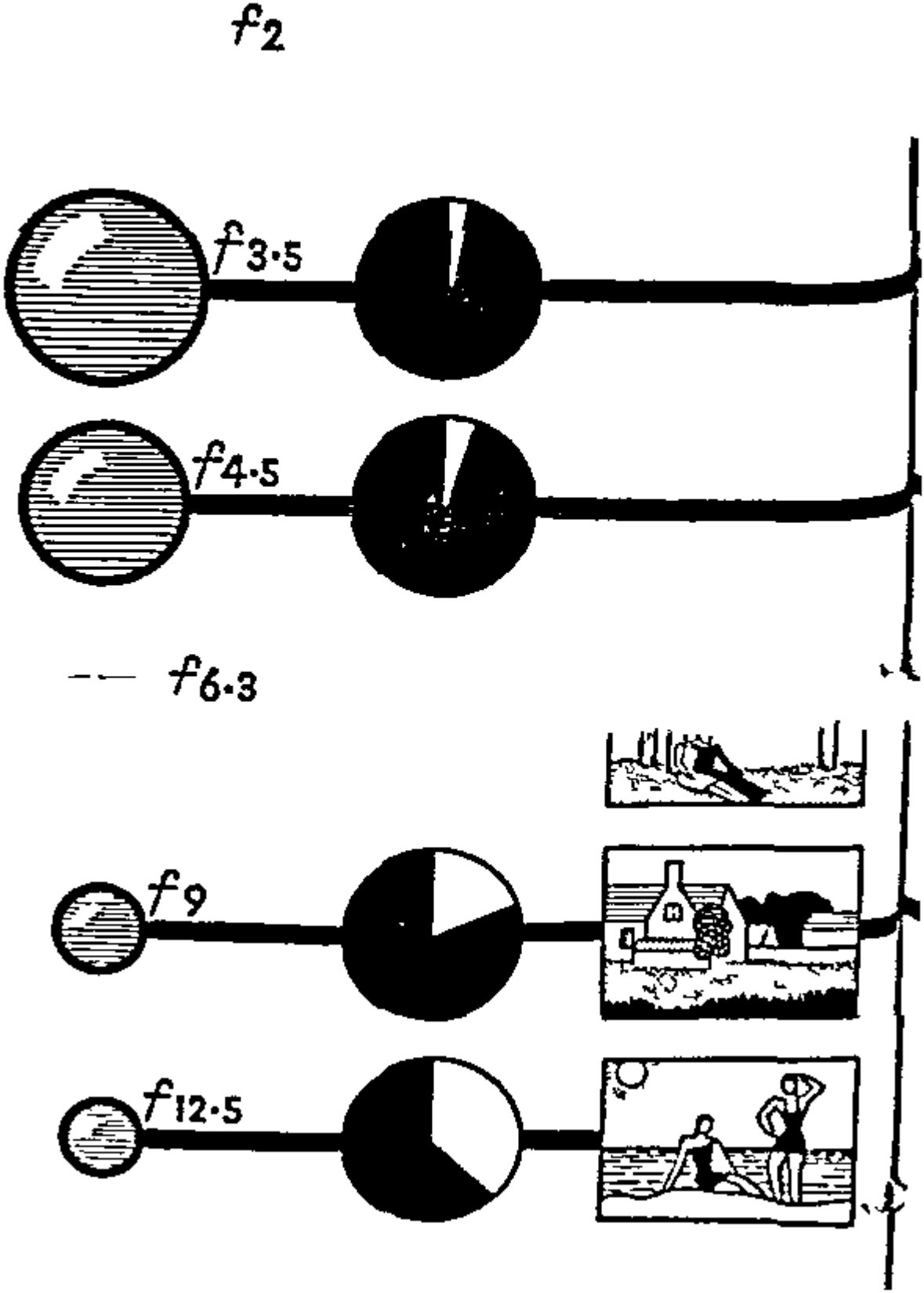
The rangefinder miniature camera (1 × 1½" = 24 × 36mm negatives) is undoubtedly the most advanced type among modern cameras It is automatic to a high degree · distances are automatically measured by means of an optical instrument, even the exposure meter is sometimes built into the camera, and shutter and film winder are coupled It is possible to adapt the camera for various purposes, by means of lenses of different speed and focal length, and a number of delicate precision instruments permit the successful solution of the most difficult problems It has a very high rapidity of action Its shutter being speeded up to one 1/1250th of a second, and sometimes it is possible to shoot series of pictures at machine-gun speed It is the ideal camera for anyone who likes taking " candid " shots but it is also the most expensive among its kind if it is a really good one

On the whole, the choice of a camera is a matter of temperament One man may be keen on a stream-lined racer, *i e*, a rangefinder miniature camera, a precision machine giving first-class results Another likes an elegant coupé, *i e*, a modern reflex camera, which is easier to handle, and yet nearly, if not quite as good as a miniature camera A third may like the comfort of a carriage and pair, such as a plate camera, with all the pleasure that a slow, contemplative journey brings in its train, and finally there may be a few who prefer walking, and so will buy a box-camera

What your Camera will do

Camera	Field of application	Advantages
 Box	Snapshots in good weather hol day seaside groups land scapes	S mplest handl ng pract cally sett ngs inexpensive
 Fold ng	General purpose camera for the amateur all types of snapshots even in poor l ght portra ts, groups landscapes	Folds to small size s mple hand l ng few settings suitable fo unfavourable l ght condtions med um priced
 Simple M n ature	Same field of application as fold ng camera	Small pocketable quick readi ness great depth of focus, low to med um priced
 Precision Miniature	Universal camera of high preci s on for amateur and profess onal	Small coupled rangef nder fast interchangeable lenses semi automatic work range of specialised attachments
 Plate Camera	General purpose camera for professional also for copying and close-up work	S ngle exposures composition and focusing on ground glass screen med um priced
 Twin-lens Reflex	Universal camera for all fields of amateur photography	The reflex image allows of seeing a proof of the p cture definition and composition before taking
 Single-lens Reflex	Universal camera for all fields of photography including tele and close-up work	As twin-lens reflex interchange ability of lenses for tele work extension tubes for shortest distances
 Rangefinder Roll film	General purpose camera for all types of amateur work	As fold ng camera in add tion coupled rangefinder allows for more exacting work

Disadvantages	*Lens and Shutter*	*Film and Picture Size*
Slow lens no (or little) variation in shutter speeds bulky	Meniscus lens about *f* 12.5 Shutter speed : Instantaneous (about 1/30 sec.) and Time exposure	*Film* 27 (*V.P.*) for 8 exposures 2¼ × 1¼" (4 × 6.5 cm.) or 16 exposures 1¼ × 1¼" (4 × 3 cm.) *Film* 20 for 8 exposures 3¼ × 2¼" (6 × 9 cm.) or 12 exposures 2¼ × 2¼" (6 × 6 cm.) or 16 exposures 2¼ × 1¼" (4.5 × 6 cm.)
	Anastigmat lens *f* 7.7 to *f* 4.5 Shutter speeds 1/25 1/50 1/100 B and T Some with speed range from 1 sec to 1/300 sec.	*As above and Film* 16 for 8 exposures 4¼ × 2¼" (6.5 × 11 cm.) or 12 exposures 2¼ × 2¼" (5.5 × 6 cm.)
Small negative size needs enlarging to get album size print	Anastigmat *f* 6.3 to *f* 2.8 Shutter speeds : 1/25 1/50 1/100, B Some with speed range from 1 sec. to 1/500 sec	*Film* 35mm for 12 to 36 exposures 1¼ × 1" (24 × 36 mm.) or 24 to 50 exposures 1 × 1" (24 × 24 mm.) *Film* 828 *Bantam* for 8 exposures 1⅛ × 1½" (28 × 40 mm.)
Expensive small negative size requiring exacting technique	Anastigmat *f* 3.5 to *f* 1.5 also Tele and W.A. Angle Shutter range from 1 sec to 1/1000 B and T	*Film* 35mm. for 36 exposures 1¼ × 1" (24 × 36 mm.)
Slow in taking bulky mostly used from tripod	Anastigmat *f* 7.7 to *f* 4.5 Shutter speeds : 1/25 1/50 1/100 B and T Some with speed range from 1 sec to 1/250 sec.	*For single exposures on glass plates or cut film. Can be used with roll film adaptor or for (individually removable) film packs* sizes 3¼ × 2¼" (or 3¼ × 2½") (6.5 × 9 cm.) 4¼ × 3¼" (approx. 9 × 12 cm.) 5 × 4" (10 × 12.5 cm.)
Bulky medium to high priced	Anastigmat *f* 4.5 to *f* 2.8 Shutter range from 1 sec. to 1/500 B and T	*Film* 20 for 12 exposures 2¼ × 2¼" (6 × 6 cm.) *Film* 27 for 12 exposures 1¼ × 1¼" (4 × 4 cm.)
Medium to high priced	Anastigmat *f* 4.5 to *f* 1.9 also Tele and W.A. Angle Shutter range from 1 sec to 1/1000 B and T	*Film* 20 for 12 exposures 2¼ × 2¼" (6 × 6 cm.) *Film* 27 for 8 exposures 2¼ × 1¼" (4 × 6.5 cm.)
Medium to high priced	Anastigmat lens *f* 3.5 to *f* 2.8 Shutter speed range from 1 sec. to 1/400	*Film* 20 for 8 exposures 3¼ × 2¼" (6 × 9 cm.) or 12 exposures 2¼ × 2¼" (6 × 6 cm.) or 16 exposures 2¼ × 1¼" (4.5 × 6 cm.)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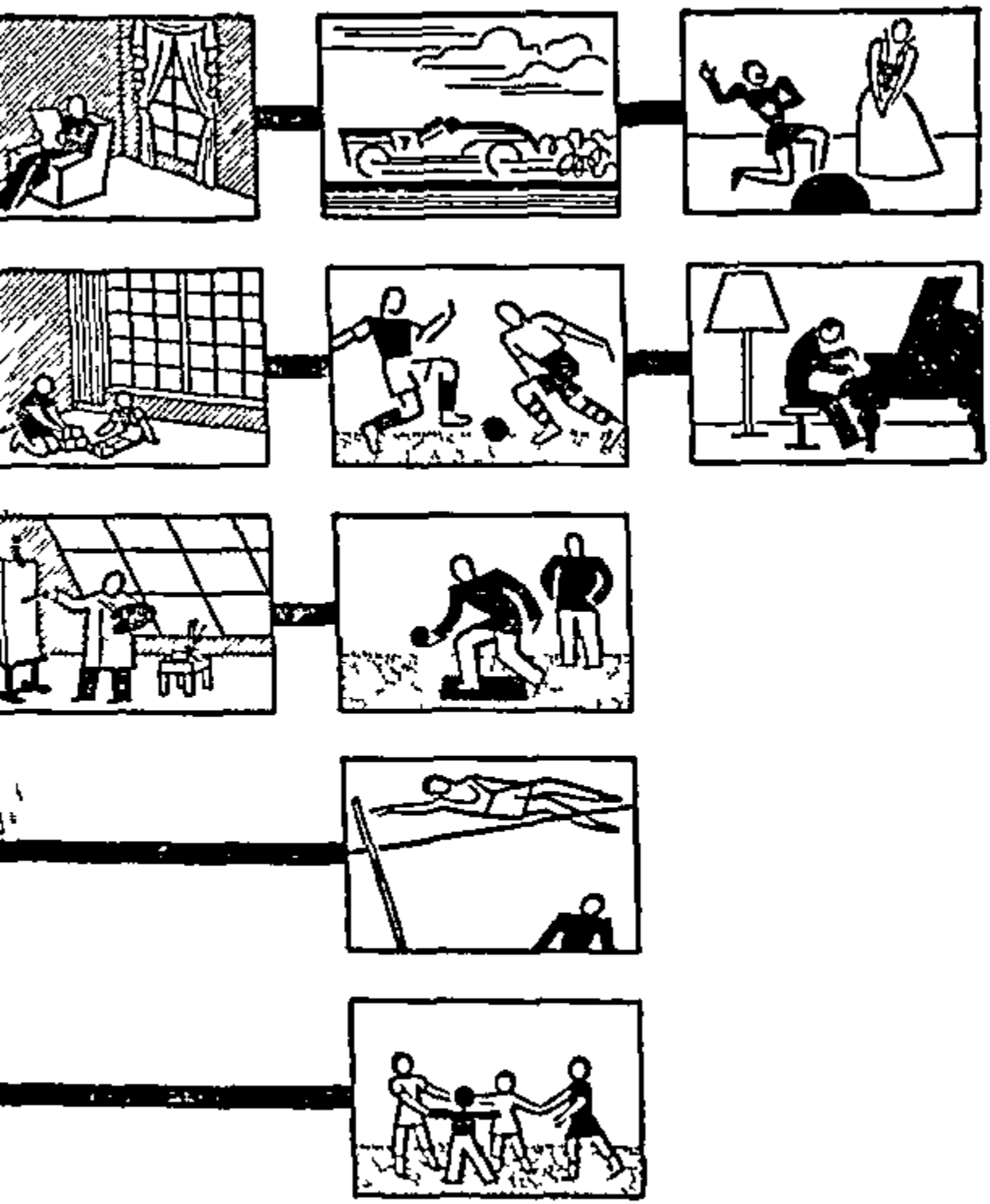


The performance of a camera is to a large extent dependent on its lens. The wider the aperture (= the faster the lens) the wider the scope of the camera. A fast lens enables you to take photographs in poor light conditions and of fast moving objects. A small aperture (= a slow) lens limits the use of the camera to good light conditions and slow subjects. If you have a fast lens you can afford short shutter speeds (as shown by the white segments on the black circles). The columns read horizontally tell what can be expected from a lens. For example with an f2 lens shots of people indoors, fast moving cars as well as stage photographs, can be taken. With an f6.3 lens people outdoors under trees as well as not too fast sports pictures (the jump is, at the point shown, here slow) are possible.

HINTS AND TIPS

Protect Your Camera

If you value your camera do not drag it about unprotected in city streets or dusty country roads, in woods and fields. A camera is a piece of delicate mechanism and must be protected from dust.

Nor are prolonged air and sunbaths beneficial to its health. The lens will suffer from prolonged exposure to the sun.

So get a proper case for your camera. Best of all, buy an "ever-ready" case which allows you to take a picture without removing your camera from its carrier.

Fine sand is especially dangerous, as it gets through the smallest chinks of the camera, making the shutter grate for weeks. If this happens the camera must be cleaned by an expert.

Like the human eye, an electric exposure meter cannot bear direct sunlight for long. So do not point it directly at the sun. Whereas the short exposure necessary for making measurements will do no harm, prolonged exposure to direct sunlight may injure the delicate mechanism for good.

About Tripods

Tripods may be had nowadays which fold up small enough to go into a lady's handbag, but which extend to a height of 4 feet. Being made of light metal they are very easy to carry about.

Exposures of $\frac{1}{2}$ or even 1 second can be made with the help of what is sometimes known as a "chain tripod," though it is not a tripod at all. It consists of a metal screw, fitting the bush in the base of the camera, from which hangs a long chain. You stand on the end of the chain and press the camera firmly upwards. This gives the necessary stability which makes possible the exposures mentioned.

A string, tied to the camera, can be used as a substitute for the chain, but is not so reliable.

It sometimes happens that the legs of the tripod start to slide apart on the slippery floor, with great risk to the precious camera. To prevent this, stand the tripod on a little mat.

ANY CAMERA can take a picture like this. The lighting conditions are ideal and so any lens will do. There is practically no movement in the scene and so any shutter speed will do. A cheap box camera will here answer the purpose as well as a plate camera with a tripod. (See pages 18-19.)—Photograph by *R. Schwarzgruber.*

RAPID MOTION of this kind wants a shutter which is able to respond to the fastest speeds The picture above was taken w th 1 1000 of a second Only focal plane shutters will produce such speeds They are found in miniature cameras of the measuring type and some of the reflex cameras (See pages 18-19)—Photograph by *M. Sch mer*

MOTION AND RESTRICTED LIGHT call for a very fast lens This picture was taken with one of f 1 5 aperture, which is almost the fastest that can be found Lenses l ke th's are usually attached to the modern miniature of the measuring type Such fast lenses would be quite Impracticable with larger sized cameras (See page 19)— Da ly Mirror photograph by *Lancelot V n ng*

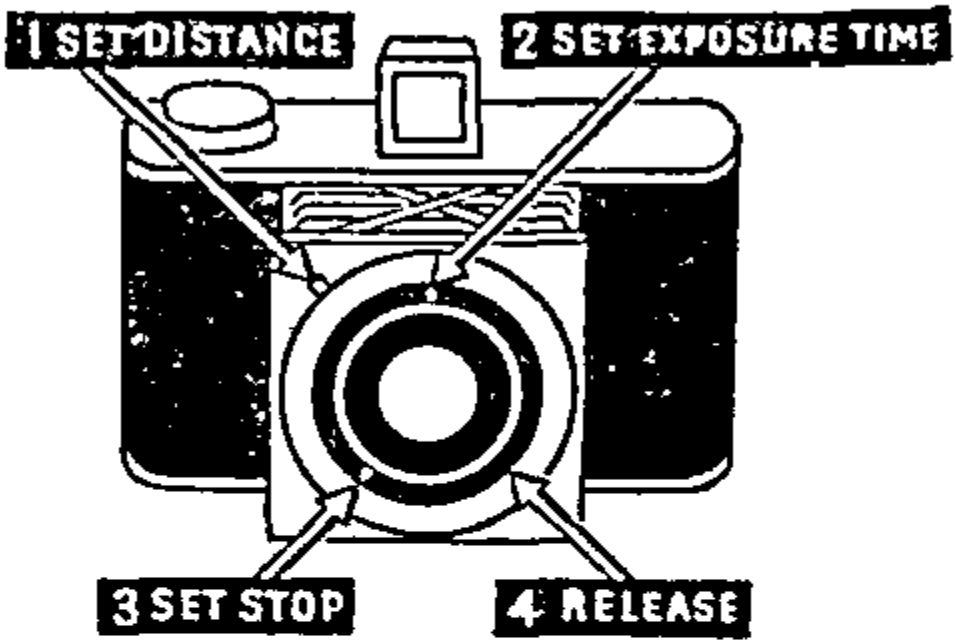
BOTH THESE PICTURES were taken from the same distance and with the same camera but lenses of different focal length were used The picture at the top was taken with a 2 inch (5 centimetres) lens the picture at the bottom with a 7 inch (18 centimetres) lens Interchangeable lenses add to the versatility of the measuring miniature and the one-lens reflex cameras. (See pages 18-19)—Photograph by *Christopher Croeber*

TAKING THE PICTURE

Basic rules and individual examples of successful technique

FOR BEGINNERS ONLY

This Is All



1 Set on the distance scale in feet (or in metres) the distance between the camera and the subject to be photographed The distance may be guessed paced out (a normal step being approximately 3 feet) or measured with a rangefinder If objects both near to the camera and farther away are to be sharp, make use of the zone-focusing explained on p 46.

2. The exposure time is set by turning the index lever opposite the exposure figures to the speed wanted The figures 25, 50 100 etc., stand for fractions of seconds i.e., 1/25 1/50 1/100 sec. The most useful exposure time for outdoor work is 1/50 sec., short enough to arrest average movement and camera shake. With a medium fast film, 27° to 29° Scheiner and the stops set out under 3 little can go wrong

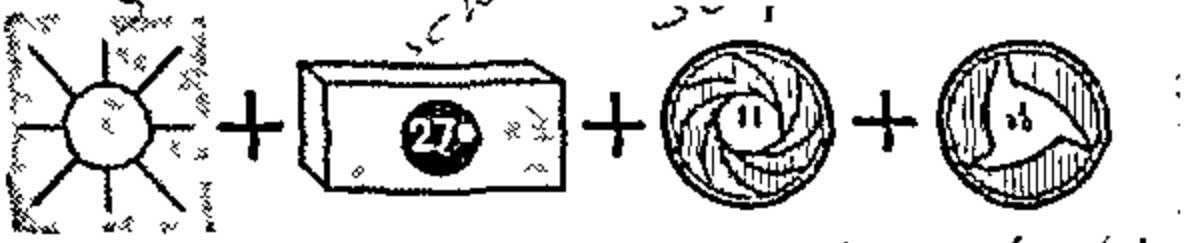
3 Set the stop (also called aperture or diaphragm) by moving the index lever to the figure required The smaller the stop (the higher the figure) the more will both fore and background be sharp With 1/50 sec. as suggested under 2 use with

Brilliant Sun	*f* 12.5 (or *f* 11)	Overcast Sky	*f* 6.3 (or *f* 5.6)
Weak Sun	*f* 9 (or *f* 8)	Dull Day	*f* 4.5 (or *f* 4)

4 To expose the film look through the finder to determine the field to be included in the picture and press the release lever gently while holding the camera firmly and still.

After having exposed wind film on to the next number.

Exposure by Rule of Thumb



On a sunny day and with a film of 27 degrees Scheiner in your camera there is nothing to fear. You set the diaphragm (or stop) at 11 and the shutter at 1/50 second and can take home very nice pictures of any of the usual subjects: Tom and Mary in their hiking outfit, Baby's first steps on the lawn, Miss So-and-So on the diving board—all without the help of an exposure meter.

So with sunshine, 27 degrees Scheiner, stop 11, and shutter at 1/50, photography is simplicity itself. You can find dozens of these subjects illustrated in photographic magazines, calendars and similar publications, all taken under these conditions Sometimes you will see it stated that a film of 25 degrees Scheiner has been used, or else that the exposure given was 1/100 instead of 1/50 second. But these variations need not worry anybody. The final result is usually the same, because the lower degree of sensitivity of the film or the shorter exposure has usually been made up for by a larger aperture, 8, for example.

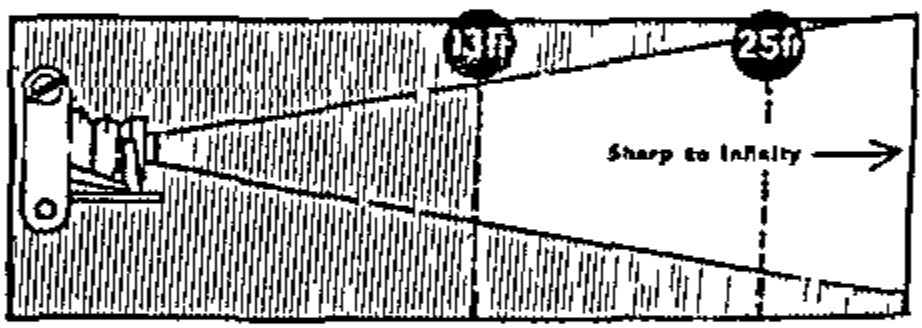
Moreover, modern films possess what is known as latitude, which suppresses any small differences of exposure without any difficulty. That is, it is no longer of any great importance if, on many occasions, you give 1/50, where an exposure of a 1/100 second would have done.

So with sunshine, a highly sensitive film, and a medium stop and medium exposure, you are fairly safe in dealing with the usual run of subjects It is no accident that the

simple box camera, which has neither an adjustable diaphragm nor a variable shutter speed, produces excellent results, even in the hands of the merest tyro Box cameras are usually provided with aperture 11 and with a shutter which works at a speed of approximately 1/30 second

But with a box camera you must have good weather and highly sensitive film If these essentials are fulfilled the necessary conditions are present to produce well-exposed films of the usual subjects without the necessity of racking your brains with all sorts of complicated calculations.

An Easy Way of Focusing



Of course we want our pictures to be sharp

Now there is a very handy method which enables you to take in objects which are quite near as well as things in the distance To get all these things sharp on your film you must have a medium-sized aperture, say, 8, one which is quite useful in any case with sunshine and a medium exposure (See page 41) This aperture gives you great depth of field, and if the camera is set at 25 feet, the area of sharp definition actually begins at a distance of about 13 feet in front of the lens and reaches as far as the horizon *To infinity* as the experts put it

Provided, therefore, that an object is not within 12 or 13 feet of the camera, it will be in focus the picturesque

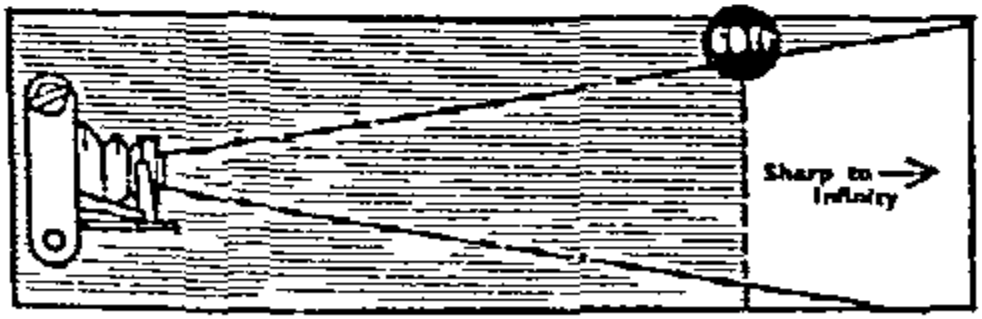
market-cross, the ivy-covered church tower or the mountain with its pine forests and snow-capped peak That is to say, this *near to Infinity* focusing will give you a picture containing objects in the foreground and objects in the far distance, all of them with the same sharpness of definition

Owing to the great depth of field it provides, this *near to Infinity* focusing (focusing at what is called the "hyper-focal distance") is quite useful even for reflex cameras, with which, it is true, you usually focus by means of the ground glass screen, or with cameras fitted with a focusing scale But its real usefulness is for the simpler types of apparatus which possess neither ground-glass screen nor focusing scale and are therefore sometimes known—rather unkindly—as "blind" cameras

The exact figures for various focal lengths for the "near to Infinity" setting are

Focal length	*Camera size*	*Distance-scale setting*	*Stop*	*All sharp from*
3 5 cm (1½")	Miniature	12 feet (4 m)	8	6 ft
5 cm (2")	Miniature	25 feet (8 m)	8	12 ft.
7 5 cm (3")	V P 2½ × 2½"	25 feet (8 m)	8	12 ft
10 5 cm (4½")	3¼ × 2½"	25 feet (8 m)	11	12 ft

Another Simple Method of Focusing



If you look on the focusing scale of your camera you will notice, in addition to the number of feet, the sign ∞ (Infinity) If you set your camera at this point, distant

objects will be sharply focused and objects near the camera will be out of focus This differs, therefore, from the previously mentioned "near to Infinity" focus which gave sharp definition to both near and distant objects If you set your camera at Infinity, you will get the distance clearly, even with a wide stop, whereas the near to Infinity focus needed, you will remember, a medium or even a small aperture

So you set your camera at ∞ when there is nothing close to the lens Landscapes without any foreground, aeroplanes flying in formation against the clouds, and all such distant motives can best be captured by the *Infinity focusing* It is also useful for pictures taken from a hillside, looking down into the valley, or from the top of a tower, provided that the nearest objects, tree-tops, roofs, etc., are far enough from the lens

How far away they must be depends on the size of the camera, or, more exactly on the *focal length* of the lens—(this is printed on the lens mount)—and on the size of aperture used

Focal length	*Camera size*	*Infinity begins for* Stop 4	Stop 5 6
3 5 cm (1⅜")	Miniature	33 feet (10 m)	22 feet (7 m)
5 cm (2")	Miniature	60 feet (19 m)	45 feet (14 m)
7 5 cm (3")	V P K 2¼ × 2¼"	60 feet (19 m)	45 feet (14 m)
10 5 cm (4⅛")	3¼ × 2¼"	90 feet (28 m)	65 feet (20 m)

So you see that even with focusing to Infinity the beginning of the area of sharp definition is fairly near to the camera—nearer, perhaps, than you would expect

But You Must Have Sunshine

The formula Sun + 27° Scheiner + stop 11 + 1/50 second (see page 35), coupled with focusing at 25 feet as already described ("near to Infinity"), is a magnificent

golden rule, a rule for woods and meadows, a method for producing hundreds of excellent pictures without tears. It ensures sharp definition for everything further away from the camera than 13 feet, and gives sufficient illumination. The exposure of 1/50 second is rapid enough for any not too quickly-moving objects outside the minimum distance, and if the objects in motion are a long way away from the camera, then even more rapid movements, such as of children at play, animals, cars travelling at a moderate speed, will be quite sharp on the film. You will not need either an exposure meter or a distance meter and you will snap your picture while others are still fumbling and calculating how to do it.

With this amount of information you can trust the veriest beginner with a camera to come home with good pictures, provided he realises (or at any rate observes) the limitations of the method.

Remember: the area of sharp focus does not begin until the object is at least 13 feet from the camera, and sunshine is essential. If the sky is clouded over you must lengthen the exposure to 1/25 second. But in that case you must make doubly sure that no fast-moving objects come into the picture, as otherwise this relatively slow shutter speed could not cope with them. And hold the camera still!

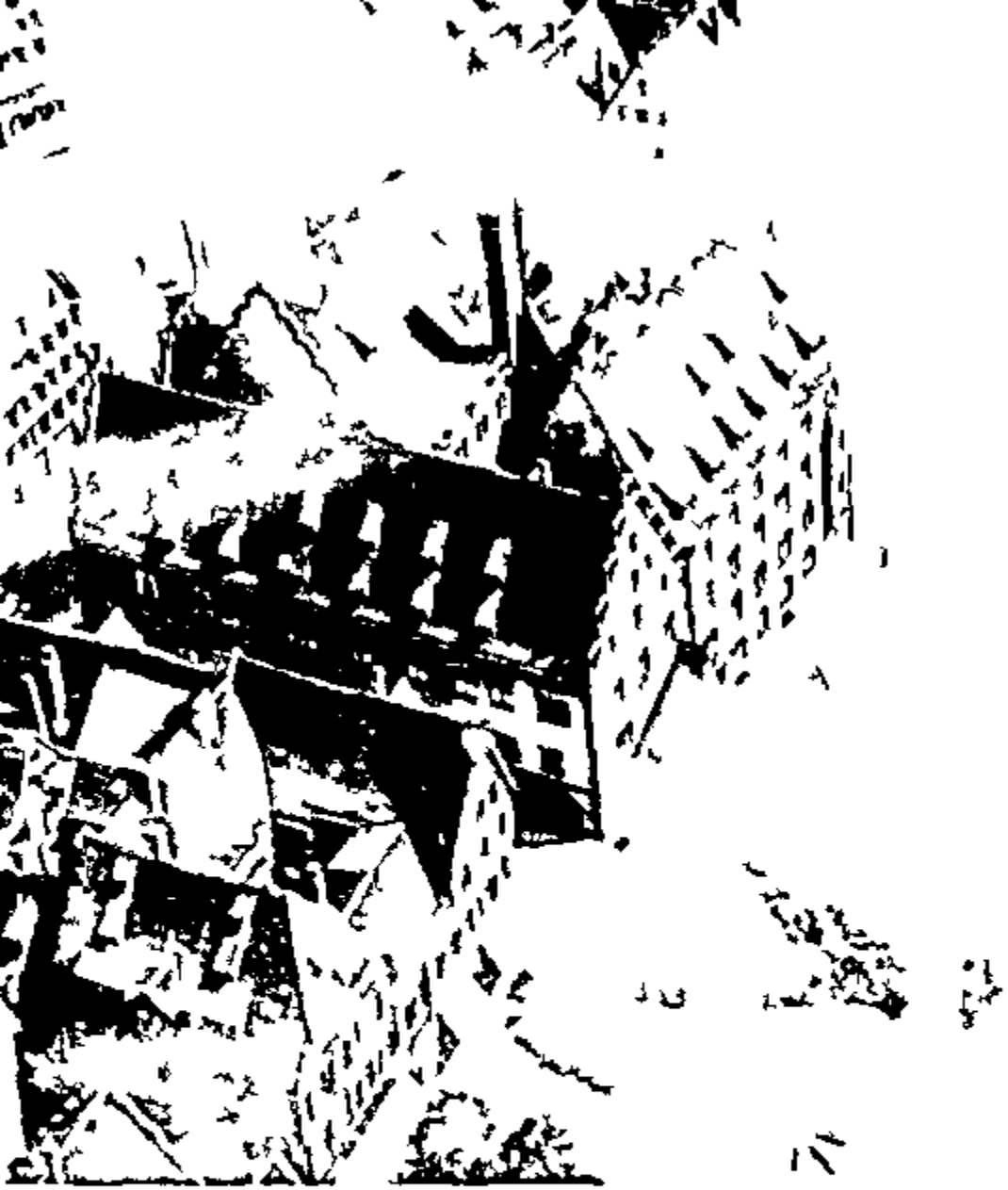
In any case this handy rule of thumb, with its merely approximate length of exposure, requires suitable compensatory treatment in the dark-room That is, care must be taken to ensure that the moderately-exposed parts of the picture appear clearly and that the over-exposed parts are damped down. So choose a reliable firm to do your developing.

In Other Cases Use an Exposure Meter

The easy rules we have just described are only applicable to favourable lighting conditions. In cases where these are

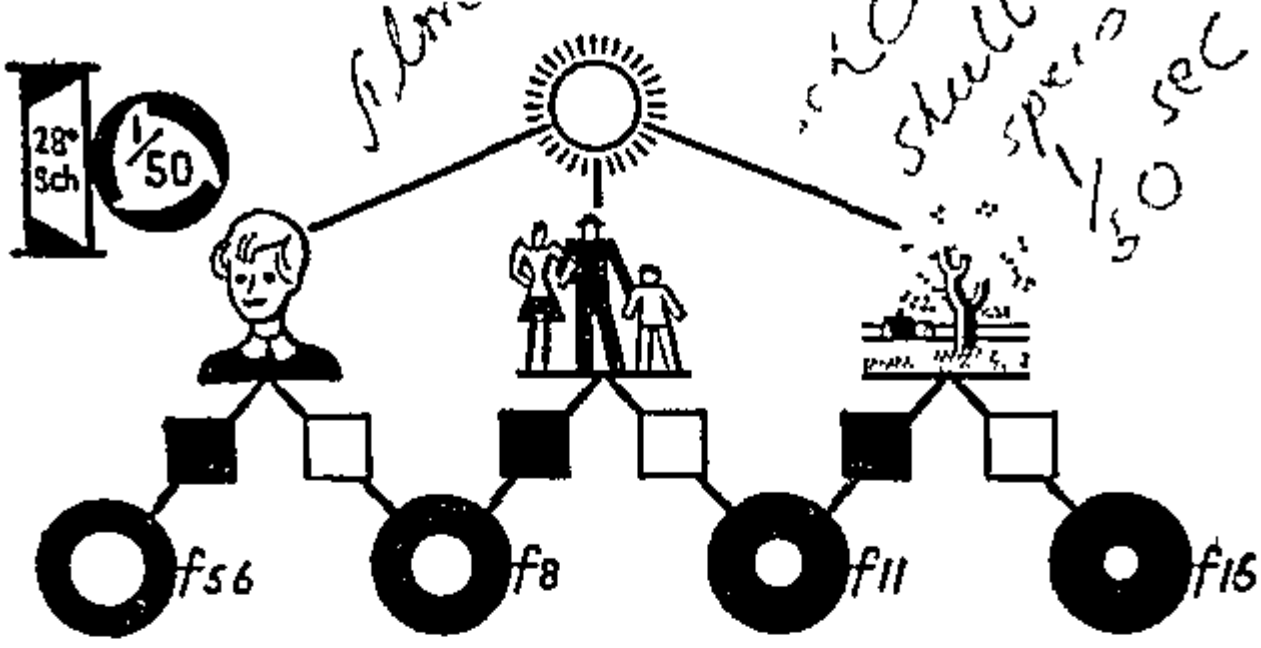
IDEAL CONDITIONS plenty of sun the subject is practically motion less and there is a f lm of 27 Sch in the camera. There is noth ng to h nder the photographer from stopping down as far as 11 H• s quite safe in giving 1/50 second exposure Even where a very bright sky really called for only 1 100 second he did not make a real m stak• (See pages 31 32)—Photograph by T Gremmler

THE FOREGROUND a group of houses is only a few yards from the camera. The background is quite far away at infin ty In a case l ke this the camera is focused at 25 feet and with a stop of f 1 it will give a sharp picture over the whole depth of the scene (as descr bed on pages 32 and 33) The exposure was 1/25 second —Photograph by *H van Wadenoyen.*



THE SUBJECT OF THIS PICTURE IS AT INFINITY far below the h l from which it was taken There is no foreground to be t.ker Into consideration The inf nity focusing (as described on pages 33 and 34) can be applied in this case The exposure was / 50 second and stop 11 —Photograph by *T Padelt*

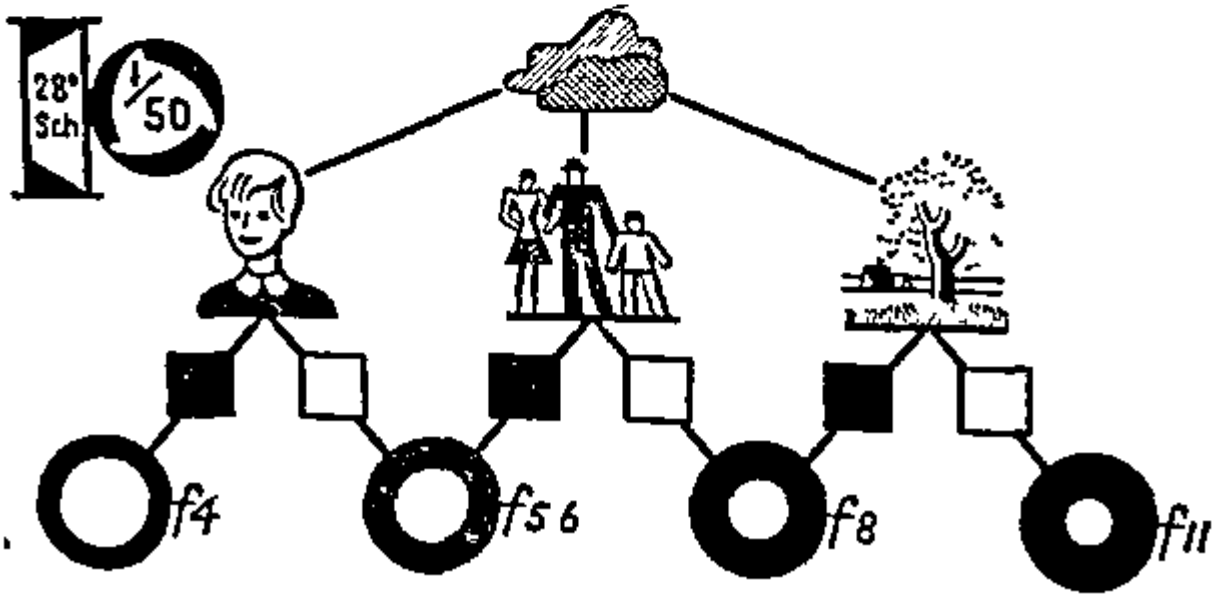
HEAVY SHADOWS are here side by side with brilliant patches of light. No exposure rule of thumb will help us this time. An electric exposure meter should do excellent service. But even the exposure meter will have to be used with care. The exposure was 1/50 second and stop 5.6 was used. (See pages 35, 36, 41.)—Photograph by *G. Gesell*



THIS DAYLIGHT EXPOSURE-FINDER assumes the use of a medium speed film of 27-30 degs Sch and a Shutter speed of 1/50 sec *The stop* shown in the bottom rows will always secure a satisfactorily exposed picture If you trace the line down through (1) weather condition, (2) subject, (3) tone of subject i e, dark or light, to (4) "stop" required

The upper drawing will guide you in sunny conditions. *The lower drawing* will guide you when the sky is overcast.

Example If you photograph in sunny weather somebody wearing light clothes at medium distance you may use stop 11—but if the weather is dull and your subject wearing dark clothes close to the camera you need stop 4—provided that in both cases medium speed film is used and your shutter speed is 1/50 sec.



Winding the Film

Owners of ordinary roll-film cameras will be well advised to wind on the next length of film as soon as an exposure has been made This ensures that an unexposed portion of film is in position for the next snap, which may be taken in a week's time The danger of two pictures, one on top of the other, will thus be avoided

Really cunning photographers wind the film only until the number begins to appear in the little window Then, just before making the next exposure, they complete the winding, with their camera opened out. This is to tighten the film and to avoid any possible curving due to the suction caused when the camera is opened

Always wind the film with your folding camera open Otherwise the folds of the bellows may press upon the emulsion and leave parallel black lines which will spoil any enlargement.

Keep a Record

It is a sound policy for the beginner as well as for the advanced photographer to keep careful notes of exposures taken These notes should include (1) the subject taken, (2) the film used, (3) the time of day, (4) the light conditions, (5) stop, (6) shutter speed On seeing such notes an expert could tell why a picture is not as good as it should be It will also enable you to look up what you have done previously should you come across similar photographic conditions another time

THE PROBLEM OF MOVEMENT

The Importance of Instantaneous Snaps

It is usual to divide the long series of commonly used exposures into two parts Exposures of 1/50 or 1/100 second or less belong to the instantaneous group, whereas the slower shutter speeds, such as 1/10 or 1/5 second, and so on, count as time exposures that is, those for which the shutter is opened and then released at the desired moment

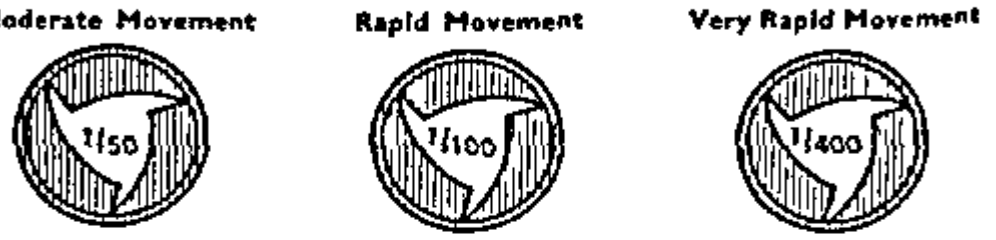
The 1/25 second shutter speed holds a position mid way between instantaneous and time exposures, sometimes being counted as one and sometimes the other If your hand is reasonably steady you will be able to give an exposure of 1/25 without moving the camera A picture of this kind, made without the help of a tripod or other fixed support, can be counted as a snap—an instantaneous exposure

On the other hand, there are excitable people who are unable to give an exposure of 1/50 second without wobbling or shaking the camera, with the result that the picture is two-fold or three fold or merely blurred all over The result in any case is a failure Such people should certainly consider 1/25 as being a time exposure and either use a tripod or place the camera on a firm base before pressing the release Only in this way can they hope to keep the camera perfectly steady and obtain a stable image on the sensitive emulsion of the film inside

With modern photographic materials, both plates and films, the emulsion is so sensitive, that is, the films are so fast that most pictures taken out-of-doors can be given quite short exposures, even when the sky is overcast or when shadows cast on the model decrease the light value Even when reckoning with a small aperture the exposure meter will often indicate 1/50 or even 1/100 second, and the question of giving the longer exposures arises only in

exceptionally unfavourable lighting conditions such as might occur in the early morning or late evening or with photos taken indoors. But otherwise you can do everything you want with short exposures, and you will find that these instantaneous snaps will be considerably more numerous than time exposures.

Moving Objects Demand Short Exposure



When you take a picture of people or things in motion, the movement in front of the camera is reproduced by the image which is thrown by the lens on to the film So the image must not be allowed to remain on the film long enough for the movement of arms and legs, cars and other moving vehicles, to result in a visible shifting on the film

If the movement is moderately rapid, an exposure of 1/25 second will probably be short enough, though, for safety, 1/50 is to be preferred Even quickly-moving vehicles and so on can be taken at this speed, provided they are at a great distance from the camera.

The swifter the movement and the nearer the moving object is to the camera, the shorter the exposure Photos of sporting events often require a shutter speed of 1/500 second, and even this may be only just short enough. If the object, runner, car, etc., is moving away from the camera, the exposure can be somewhat longer, provided that the snap is taken at an acute angle For example, a car disappearing into the distance straight in front of you will require a much less rapid exposure than one which is passing in front of you from one side to the other.

In photographing rhythmical movements—such as high-jumps, exercises on the horizontal bar, swings and so on, wait for the *dead point*, that is the moment at which the jumper, for instance, reaches his highest point before starting to come down If your timing is accurate, the action picture will, in reality, be made from a stationary model On page 56 a table will be found giving the maximum reliable exposures for various rapid movements.

If the photos are to be enlarged the original negative must be needle-sharp in every detail, for even the slightest trace of blurring in the film will be plainly visible on the enlargement And the higher the magnification the more apparent will the defect appear on the enlarged copy.

Since the image is only allowed to remain on the emulsion for a very short time, the diaphragm must be wide open to allow more light to come in This means that the depth of field is considerably reduced, and this means, of course, that the greatest care must be taken to focus accurately For it would be useless to avoid a blurred image due to rapid movement, if the picture is going to be spoiled by being out of focus

The FOCAL STOP AND SPEED CHART shows the shutter speeds you need for moving objects besides other useful snapshot data

Snapshots Must be Snappy!

The technique of snapshotting can only partially be learned For the rest it is a question of luck and a good nose for any likely subject which may crop up The genuine snap is neither planned nor posed It just happens, to-day, next week, here, there, round the next corner

You must be very quick if you don't want to lose the really good snap It is now or never A moment later and you are too late Press photographers with all their wits about them have shown us what can be done in the way of unpremeditated snaps But there is no need for the amateur

to wait for an aeroplane crash or a street accident. Good snapshots can be quite harmless and pleasant.

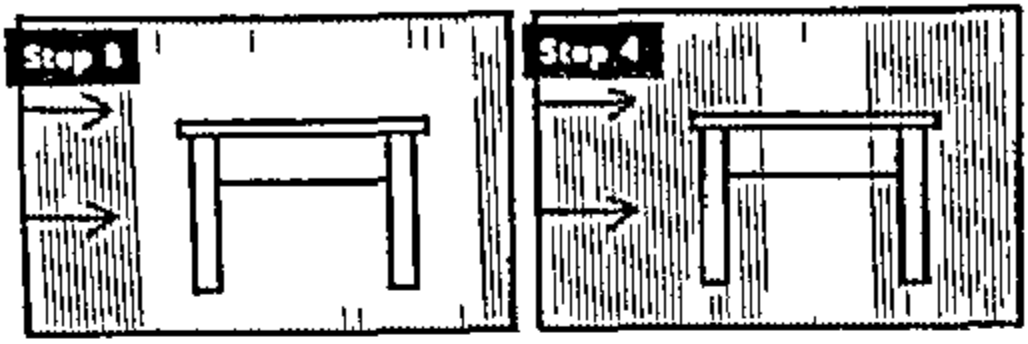
When Nigger, the cat, thinking he is quite alone, stands on his hind legs and delicately dips a paw into the bowl of gold fish, or when the girl at the bus stop opens her handbag and begins to renew her war-paint—here is your chance for a snapshot. So out with your camera and snap. The picture must be safely on the film before Nigger, realising that he has an audience, assumes an innocent pose or makes himself scarce, and before the lady sees her bus coming and pops the mirror and lipstick back into her handbag.

This is where good photographic technique comes in. Of course good lighting is highly desirable. To make sure, see that your camera is loaded with a good, rapid film. Use stop 11 (or 8 if the light is poor) and set the shutter at 1/50 second. There remains the question of focusing. "Near to Infinity" will not do here, seeing that the area of sharp definition only begins at thirteen feet in front of the camera. It is no consolation to know that it extends right over the houses on the other side of the street. We need a "snapshot-setting." We do not need sharpness in the distance, so we focus at 13 feet. The area of sharp definition now lies nearer to the camera:

Focal length	*Camera size*	*With Stop 4 sharp*		*With Stop 5 6 sharp*	
		from	*to*	*from*	*to*
3 5 cm (1⅜")	Miniature	7 feet	∞	7 feet	∞
5 cm (2")	Miniature	9 feet	19 feet	8 feet	27 feet
7.5 cm (3")	V P., 2¼×2¼"	9 feet	19 feet	8 feet	27 feet
10.5 cm (4⅛")	3¼×2¼" (6×9 cm)	10 feet	17 feet	9 feet	21 feet

Naturally one can use this snapshot-setting for other subjects, in fact whenever near objects have to be taken quickly, though not with such extreme speed as in the cases mentioned.

A Small Stop Gives Depth of Field



With near focusing the area of sharp definition is very small It is only suitable therefore for motives with little depth of field, possibly for human beings But the problem becomes difficult when everybody sitting at the table has to come into the picture However carefully you focus, your belt of sharp definition is too narrow· either the people nearest the camera or those farthest away are out of focus, sometimes neither is properly focused It's like trying to put a bus into your garage It simply won't go in

But the necessary depth of field can be obtained by stopping down, that is, by having a very small aperture This brings every part of your subject within the area of sharp definition For this purpose stop 16, which is not much used otherwise, will not be too small Sometimes, even, there will be a case for a still smaller stop, 22, provided, of course, that the camera in question is fitted with a stop of this size

But another and less desirable result of these small apertures is the reduction in the amount of light which passes through the lens, with the consequence that the image is faint To compensate for this you must give a longer exposure, so long that the picture becomes a " time " instead of an " instantaneous " shot This in its turn means that the camera can no longer be held in the hand, and that even moderately fast movement in the field of vision will result in a blurred image All very awkward

If the exposure meter gives an exposure of 1/50 second for stop 8, the adjustment scale will show that for stop 16 the necessary exposure is 1/10 second So it is inadvisable to stop down to a pin point; one should reduce only as much as is necessary to get the required depth of field If your camera is provided with a depth of field scale, depth-of field tables are superfluous This indicates for each distance and size of aperture the area of sharp definition actually covered

The FOCAL FOCUSING CHART gives the depth of field for any lens and aperture, besides many other useful focusing figures

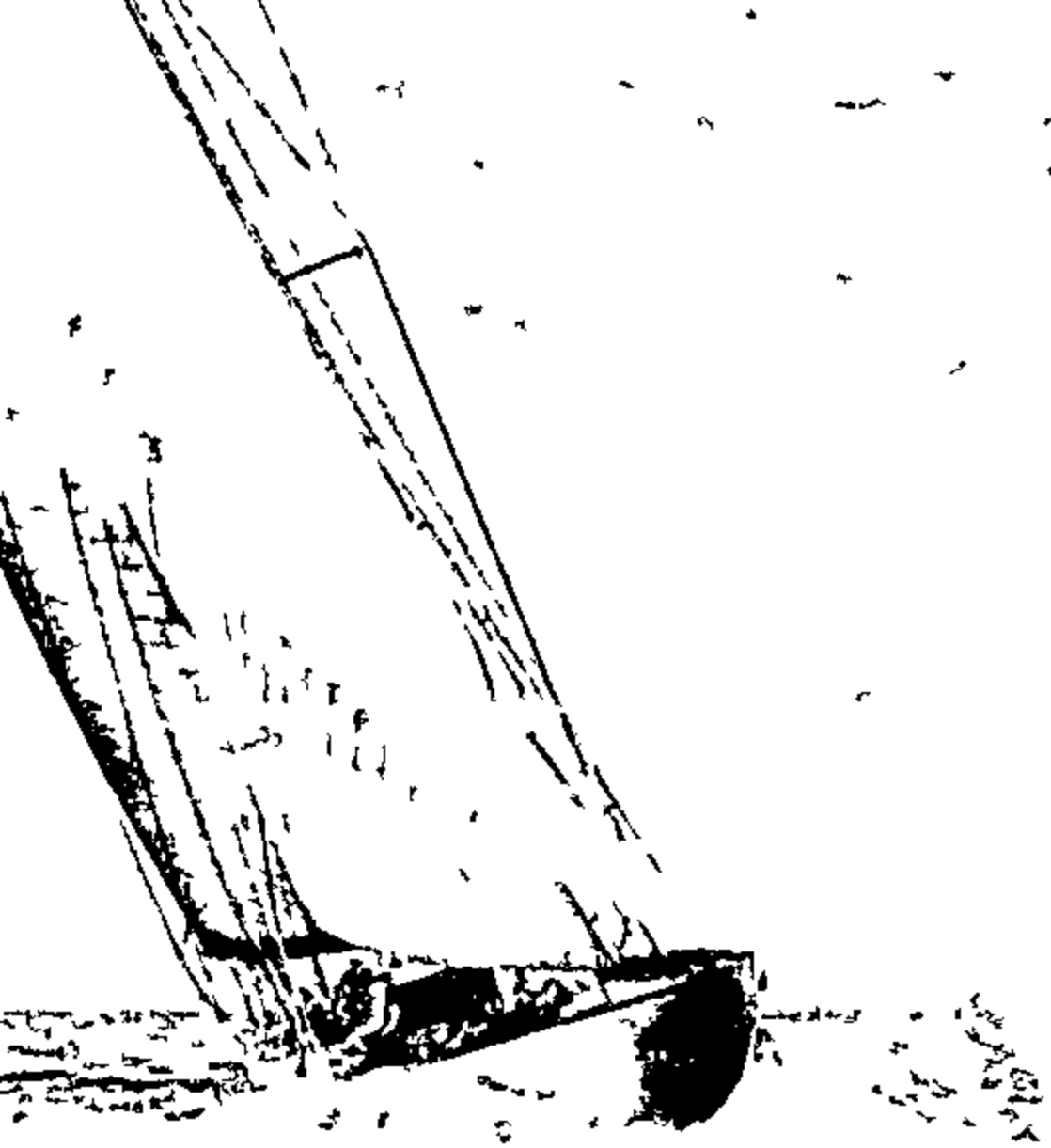
Near Views Require Careful Focusing

While it is an easy matter to get distant views sharply in focus by means of the simplest focusing method (page 34) near objects, surprisingly enough demand much greater care, and the nearer they are, the more care they require The tree a hundred yards away and the castle on the hill behind it half a mile away, will both come out sharp on the picture with the same focusing But the child playing four or five yards away must have a different focusing from the one which will be necessary if he comes up to within two or three yards of the camera

The ingenious devices with which modern cameras are fitted such as the ground glass focusing screen of reflex cameras, or the distance meters with which others are fitted are intended chiefly for close-up views For objects in the distance one could very easily get along without these refinements But if your camera does not possess any of these things, it is advisable to purchase a separate distance meter (=range-finder) in order to take the guesswork out of estimating distances

The depth of field which, in the case of distant focusing stretches to the horizon is very much reduced in the case of near focusing diminishing progressively the nearer the focus is set With the lens focused at 7 feet and the

THIS PICTURE OFFERS NO PROBLEM of movement a d no problem of focus ng either The choice both of shu ter speed and stop is left entirely to the photographer Here he has chosen stop 8 with 1/50 second but stop 11 and 1 25 second or stop 4 5 and 1 100 second would have served the same purpose —Photograph bv *Edw n Smith*



THE FAST YACHT really wanted a shutter speed of at least 1/500 second but as it was moving almost directly towards the camera a shutter speed of 1/250 second succeeded in getting a sharp picture This low shutter speed allowed the photographer to choose the very small stop of 16 thus making the focus ng much easier (See pages 44-45)
—Photograph by *F Schensky*

SNAPPY SNAPSHOTS can only be got by being photographically ready By stopping down the lens to 8 or 11 and keeping the focus at 13 feet we get a depth of field zone sufficient to catch a sharp picture of any unexpected nearby happening (See page 47) Here the exposure was 1/100 second —Photograph by *K Szollosy*

A CLOSE UP PORTRAIT should be focused carefully and the lens nc stopped down more than really necessary as we do not want to creat an extensive depth of field zone The background should be out c focus in order to make the head stand out against it (See page 48 The portrait was taken in bright direct sunshine with 1/100 second – Photograph by *H Gorny*

diaphragm at stop 8 the area of sharp definition is reduced to 3 feet, or less with a larger aperture With stops 3 5 and 4 5, and with a distance of 3 feet between the lens and the object, the depth of field is no more than a few inches ! And everything outside this small area will, of course, appear blurred on the picture

A blurred background is usually no disadvantage On the contrary it is often an advantage for objects in the background to be out of focus, so long as the general effect is not too wild and woolly When the unimportant bits of the picture are blurred, your eye will pick out the really important things and ignore the rest. But blurred details in the foreground are to be avoided Everything between the camera and the main object should be left out of the picture unless it is sharply in focus

HINTS AND TIPS

Snaps of People

To snap a child at play or a character on the market-place, begin by turning your back on your quarry Then adjust your shutter and aperture at your leisure and set the range-finder at some suitable distance Then turn round and discreetly approach the object until the picture appears in the distance meter—and release the shutter

Naturally you choose your distance at the beginning so that only one or two paces are necessary to bring the range-finder to the right distance from the object

Many people assume that pictures are always taken in the direction to which the photographer's face is turned Therefore, it is a useful trick to turn yourself at an angle of 90 degrees from your actual subject, but to point the camera itself towards it, observing the picture in the focusing screen " round the corner " This can easily be done with reflex cameras When using cameras of the measuring miniature type, you must

use a special angular view finder to do the trick. In both cases it is advisable to shade the lens as far as possible without cutting the picture, as its shine may give away the actual aim of the camera

If you intend to snap a quickly-moving object from a fixed point, say a runner on the cinder-track, your camera should be focused beforehand on some point over which the object must pass The spot should be distinguishable by some detail—a tuft of grass, or a scrap of paper placed there for that purpose—and the shutter is opened when the moving object reaches the spot in question

To take pictures over a six-foot fence or over the heads of the crowd you must use a reflex camera, holding it at arm's length over your head with the ground glass screen downwards (You have seen press photographers doing it.)

Depth of Field

The belt of sharp definition does not extend, as might be expected, equally on both sides of the focusing point It is always wider beyond the point than on this side of it

To take a striking example . with the camera focused at 25 feet (8 m) and with a correspondingly small stop (page 33), the area of sharp definition on the near side of the focusing point is only 12 feet (4 m) deep, whereas beyond the point, the belt stretches to " Infinity "—which is quite a good distance !

If your camera is fitted with a depth of field scale you should use it For one thing it gives you the region of sharp definition for every point on the focusing scale and for every aperture and makes a depth-of field table superfluous What is more, it indicates the beginning of the sharp zone for " Distant Focusing " and, in the case of " Near-to-Infinity " focusing, the best point on the distance scale for each size of stop

And, last but not least, with the help of this scale you can discover the largest aperture possible consistent with sharpness of definition for an object of known depth For there is a limit

to the smallness of aperture. Poor light or moving objects may require a comparatively large opening. Our depth of field ring shows us what is possible and what is not, and gives us the correct focusing to ensure the desired depth even with a large aperture.

A Distance Meter

Even "blind" cameras will guarantee sharply focused pictures, with the aid of a range-finder or distance meter.

A cheap form of distance meter is a metal tape measure that rolls up inside a little round box which fits the waistcoat pocket. But some subjects make the use of a metal rule out of the question The cat, for instance, nicely perched on the gate-post, would politely disappear if you thrust a measuring tape under his nose.

A proper optical distance meter, on the other hand, has the advantage of being unobtrusive as well as giving measurements up to a distance of 100 feet—which is more than a pocket-rule can do.

Supplementary Lenses

For close-up work at shorter distances than are shown by the focusing mount or distance scale of our camera supplementary lenses may be had. A meniscus lens, obtainable from the optician, will be found very satisfactory. The table on page 56, shows the strength of lens in diopters to select to cover a certain distance range. It must be emphasized that, in order to ensure the same quality of definition as the lens would give without a supplementary, one has to stop down one stop. No other change in exposure time is required.

Incidentally, if your camera has a "double-extension," you may use a "tele-lens," which increases the focal length, making distant things nearer. Stop down by two, and allow for full double extension by giving four times the normal exposure. with 50% increase of extension twice the normal

exposure must be given Should your camera have a sliding extension you may use the "close-up" lens as a "wide-angle" showing more on the picture than the normal lens But if your camera is of the fixed focus, or lazy tongs type where you move the front-cell of your lens or the complete lens in a helical focusing mount you can use this type of lens for close-up work only

USEFUL TABLES

SUPPLEMENTARY LENSES FOR CLOSE UP WORK

Lens set to	Distance of object when using lens of d opters : +0.5	+0 67	+1	+1.25	+1.5	+2	+3
∞	6 6½"	4 10½"	3 3½"	2 7½"	2' 2½"	1 7½"	1 1"
48	5 9½"	4 5½	3 ¼	2 5½"	2 1½"	1 7	1 ¼"
24	5 1½"	4 ¼"	2 10½"	2 4½"	2'	1 6½"	1' ¼"
15	4 6½"	3 8½"	2 8½	2 2½"	1 10½"	1 5½"	1
10'	3 11½"	3 3½"	2 5½"	2 ¼	1 9½"	1 5	11½"
9	3 9½"	3 2½"	2 4½"	2 ¼"	1 9½"	1 4½"	11½"
6	3 1½"	2 8½"	2 1½"	1 9½"	1 7½"	1 3½"	11½"
5	2 10"	2 5½"	1 11½"	1 9"	1 5½"	1 2½"	10½"
4 6"	2 8"	2 3½"	1 10½"	1 8½"	1 5½"	1 2½"	10½"
3 6"	2 3½"	1 9½"	1 6½"	1 5½"	1 4"	1 ½"	10"

MAXIMUM EXPOSURE TIMES FOR MOVING OBJECTS

Object	Distance of object	Towards or away from camera	Obliquely	Directly across
People animals at normal pace	25 feet	1/50	1/100	1/150
Cyclists street traffic	25 feet	1/100	1/200	1/400
Galloping horse cycle races car	25 feet	1/200	1/400	1/500
Trains 30 miles per hour	50 feet	1/100	1/200	1/300
Trains 60 miles per hour	50 feet	1/200	1/400	1/600

If twice the distance exposure may be doubled If four times the distance exposure may be quadrupled

CHOOSING THE RIGHT MATERIAL

What Speed of Film Shall I Use?

There is no such thing as a " best " film, that is, a film that is best for any and every kind of picture. It does not follow that the most sensitive, that is, the fastest film, is the best, any more than that the biggest potatoes are always the best or a racing-car the most suitable model for taking out the family

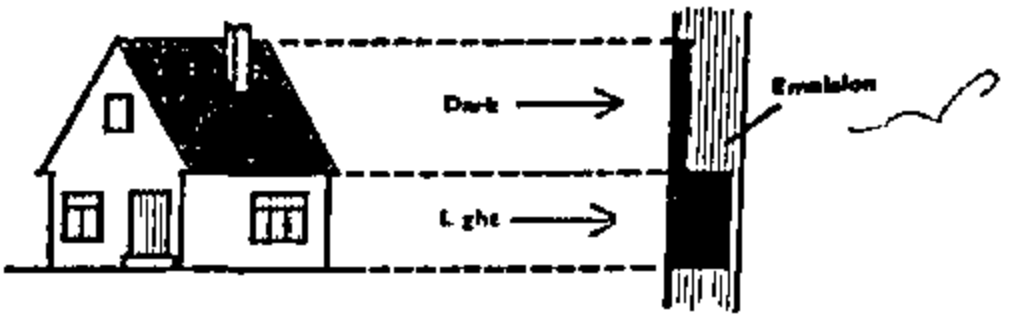
The fastest films, those with 32 or even more degrees Scheiner, are to be recommended only for those occasions which cannot dispense with great speed, even at the cost of relatively poor rendering of tone values. They are essential, for example, for making pictures of high-speed sporting events, for overcoming unfavourable lighting conditions such as prevail indoors, or, finally, for compensating for the small aperture required in order to ensure great depth of focus In any case, even high speed films possess nowadays a remarkably good tone fidelity as well as a moderately fine grain (See page 65)

Medium fast films, that is, those possessing a sensitivity of about 27 degrees Scheiner, are remarkable for their correct rendering of tone values and for the fineness of their grain Moreover, they lend themselves splendidly to enlargements and can therefore be considered as the most reliable all-purposes material

Films of less than 23 degrees Scheiner are only suitable for those specialists who make huge enlargements from tiny sections of their negatives This is possible without producing unpleasant grain, that is, visibility of the granular structure of the emulsion, owing to the extremely fine grain and high solubility All these advantages are naturally offset by a smaller degree of sensitivity

But the man who is satisfied with prints, that is with pictures of the same size as his films, or with a very moderate enlargement, would gain nothing by the use of this type of film For the average amateur the medium fast film is handier from the point of view of exposure and for straight development.

Double Layer, Thin Layer, Single Layer



Although we usually speak, for simplicity's sake, of " the " coating or sensitive layer of a film, many films possess in reality two sensitive layers, one on top of the other The effect of this is to make over-exposure harmless It has no importance for films of this kind whether you give 1/50 second exposure when the two-hundredth part of a second would have sufficed, in other words when you give four times the correct exposure! The lower of the two emulsion layers, being considerably less sensitive than the upper one, acts as a brake on the light which falls upon it

But it is important to realise that this compensating effect of the double layer only works in the case of over exposure It can do nothing to rectify faults due to under-exposure Moral when in doubt, give a longer exposure

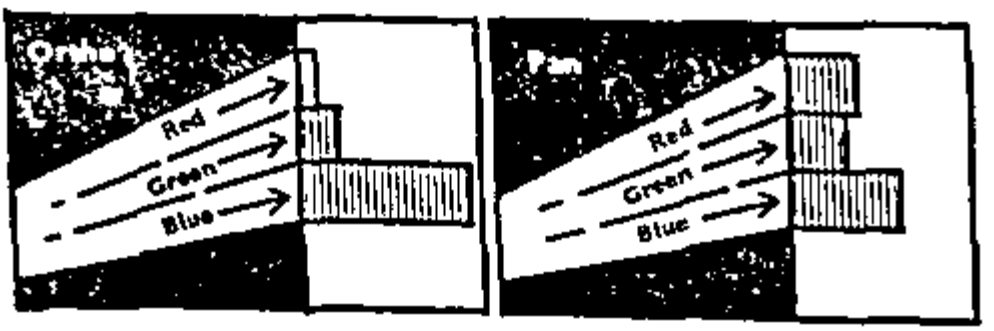
But thin as it is this double coating has one drawback As they penetrate the emulsion, the rays of light are scattered by the grains This means that every tiny point of light produces reflection, or halation and slight though this is, it is enough to spoil the extremely delicate reproduction of detail such as the lens produces The thicker the

layer, the more grains are packed together in the emulsion, and the more they scatter the light. So the latest process consists of making each emulsion layer extremely thin. This gives us what are known as *thin-layer* films, which give a remarkably true reproduction of detail, but have the disadvantage of being rather more difficult to develop correctly than films with a thicker coating.

Finally, *one-layer* films are those which have a single thin coating of emulsion of medium sensitivity (about 23° Scheiner). The result is a specialist's material possessing an extraordinarily high degree of *resolving power*. This renders it possible to make enlargements of a great magnification without sacrificing faithful reproduction of the smallest details. But films of this kind possess little or no *latitude*. They demand, therefore, the greatest care in making the exposure and considerable skill in developing.

Naturally the fundamental process of exposure remains unaltered whether the image falls on single- or double-layer film. The dark parts of the object have little effect on the emulsion, whereas the brightest parts exert a powerful influence on the silver-bromide grains

Ortho or Pan Film?



The amateur photographer has the choice of two kinds of films—apart from colour films—namely, those with *orthochromatic* and those with *panchromatic* emulsion. Both kinds are obtainable in the usual range of speeds Both reproduce

the coloured world of nature in black and white. But they are different in the way they "translate" colours.

The orthochromatic emulsion does not do it in a way that corresponds to the manner in which our eyes see colours. For example, red things especially appear much too dark, in fact, black, whereas red appears to our eye as a bright colour Orthochromatic films, in other words, are colour-blind so far as red is concerned Yellow, too, comes out too dark, whereas blue, the blue of the sky, for example, which appears to us as a rather dark colour, is rendered by orthochromatic films far too light, or even white This produces disappointing results

Panchromatic emulsion acts quite differently. It gives a much more faithful rendering of colours, though not a strictly accurate one In pictures from pan films, red appears as a medium tone, yellow very light, and blue much darker Pan films are better, too for mixed colours which contain red The tanned faces of bathers at the seaside, for example, are made completely black by ortho films, and the difference is most striking when the same picture is made on pan material

So there is no doubt as to which type of film to choose Pan film wins every time, especially since the latest makes have the advantage of dealing even with green in a more satisfactory manner than was possible hitherto Ortho films, however, which can now be considered as relics from the past, when nothing better was available, can still give good results when no red or blue enters into the picture Moreover their colour reproduction can be aided considerably by the use of suitable filters (See page 68)

And finally, ortho films are preferable for those amateurs who like to do their own developing especially when the progress of the development is controlled during the process Being almost insensitive to red light, ortho emulsion can bear the light from the dark-room lantern, so that the photographer can examine the negative

ORTHO AND PAN films were used in taking the two pictures above. The picture on the left was taken on ortho, the picture on the right on pan material. They purposely overstate the different effects obtainable. Ortho shows heavier black and white effects, emphasises unevennesses of the skin. Pan gives softer tone values, as can be seen on the hair, but inclines to register red too light, as shown by the lips. (See page 59)—Photographs by *V. Baker*

as fine-grain development (see page 216) will have to be employed.

HINTS AND TIPS

The Question of Exposure

So long as you do not under-expose, you need not be too anxious about the exact degree of accuracy Modern films have enough "latitude" to compensate for the little extra light. But this must not lead to systematic over-exposure.

There is so little difference in light values between stop 4 and 4 5, or 5 6 and 6 3 and so on, that they can be considered as interchangeable If, for example, the exposure meter indicates stop 9 you need have no hesitation in giving stop 8 Any reasonable emulsion can get over bigger differences than these (The same thing applies to the depth of focus given by aperture 4 and 4 5, for example)

Film Speed Ratings Compared

The emulsion speed of the negative material may be expressed according to different methods of testing for film speeds While a scientifically correct conversion cannot be made, the list below gives the practical relationship

SPEED RATING SYSTEMS

Scheiner	24	25	26	27	28	29	30	31	32	33
*BS, ASA, (Log)**	23	24	25	26	27	28	29	30	31	32
*BS ASA, (Arith)**	16	20	25	32	40	50	64	80	100	125
Weston	12	16	20	24	32	40	48	64	80	100
G.E.	20	24	32	40	48	64	80	100	125	160
DIN/10	14	15	16	17	18	19	20	21	22	23
H & D	500	660	800	1000	1300	1600	2000	2500	3000	4000

* Exposure Index

A USEFUL TABLE

EXPOSURE TABLE FOR DAYLIGHT

Add the respective figures in the Tables 1 2 and 3 the correct exposure time can then be taken from Table 4

1 *Subject and month value*

Subject	Jan Nov Dec	Feb Oct	Mar Sept	April Aug	May June July
Open land or seascape without foreground	5	4	3	2	1
—with light foreground	6	5	4	3	2
Outdoor subjects with normal foreground streets architecture	7	6	5	4	3
—with dark foreground Portraits groups	8	7	6	5	4
Indoors well lit near window	9	8	7	6	5
—normal	11	10	9	8	7

2. *Time and light value*

Time of day	Clear sky	Light clouds	Med clouds	Heavy clouds
9 a m —11 a m	2	3	4	5
11 a m — 2 p m	1	2	3	4
2 p m — 4 p m	2	3	4	5
4 p m — 6 p m	3	4	5	6

3 *Film speed and aperture value*

Film speed Scheiner	Stop 3.2—3 5	Stop 4—4 5	Stop 5 6—6.3	Stop 8—9	Stop 11—12 5	Stop 16—18
32°	—4	—3	—2	—1	0	1
29°	—3	—2	—1	0	1	2
26°	—2	—1	0	1	2	3
23°	—1	0	1	2	3	4
20°	0	1	2	3	4	5

4 *Result*

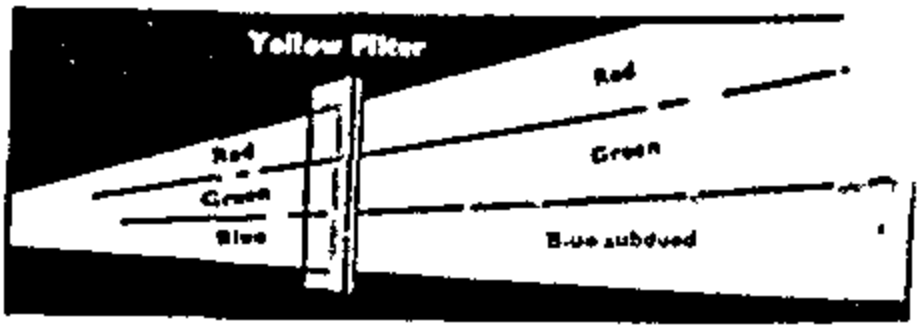
Value	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Seconds	1/500	1/250	1/125	1/60	1/30	1/15	1/8	1/4	1/2	1	1	2	4	8	15	30

Value	17	18	19	20	21	22	23
Minutes	1	2	4	8	16	30	60

As an alternative refer to the FOCAL EXPOSURE CHART or the FOCAL EXPOSURE DISC for quick and correct exposure values in any conditions

FILTERS HELP THE FILM

Filters Give Contrast



The photographic film does not always render colours in their true tone-values, so that the photograph often looks quite different from the real scene with all its vivid colours The result is disappointing This is especially true when orthochromatic film is used

For example, we want to get a picture of some white flowers standing against a dark-blue background. We get the finished print, and what do we see ? The dark-blue sky is almost white, and the white blossoms merge limply and disappointingly into it. Nor does the picture of the country scene show any trace of those beautiful cottony fine-weather clouds above the fields, while the blue hills in the distance are nowhere to be seen Clouds, sky and blue distance have all merged into a tedious, uniform white For blue, which to our eye appears dark, is rendered light by the orthochromatic emulsion

There is, fortunately, a means of improving colour reproduction If ortho material is used, a yellow filter placed in front of the lens will help This allows the red, yellow and green rays to pass, but subdues the blue ones So the somewhat " pushing " blue light can no longer have such a powerful effect on the emulsion, and everything blue in the scene will now appear darker Which is just what is wanted

But even green and yellow are improved to some extent by the filter. The yellow flowers now appear really bright and stand out clearly against the darker green of the grass. Only red remains unaffected, the orthochromatic emulsion layer being insensitive to light rays of this colour. And the filter can do nothing to help.

There are suitable filters not only for orthochromatic films but for pan. films as well The question is dealt with in detail on page 72 of this book

Making Up for the Loss of Light

The improvement in the tone values which accompanies the use of a filter is not obtained without cost Since the filter subdues certain important elements in the light which falls upon it, the consequent weakening of the image must be made up for in one way or another. Otherwise the result will be under-exposed pictures.

There are two ways of doing this. either the image can be allowed to remain for a longer time on the emulsion of the film, or else more light can be allowed into the camera. In the first case this means a lengthening of the exposure, and in the second a widening of the aperture. The result in both cases is to strengthen the image on the film.

If great depth of focus is considered desirable, in the case of near views, for example, then a longer exposure is indicated. If, however, a short exposure is essential, for example, if the object is in rapid motion, the extra light must be provided by a wider stop

If a *light*, that is, a faintly-coloured yellow filter, is used in conjunction with good orthochromatic film, it is usually sufficient to double the time of exposure, or to use the next bigger stop. For example, instead of giving an exposure of 1/100 second, one would give 1/50 second, or, using the second method, stop 5.6 would be used instead of 8. The *multiplying* or filter factor, which in this case is 2, will be considerably bigger if a darker filter is used.

Exact figures can only be given for each particular case, that is for the particular film used, for the exposure ratio depends not only on the nature of the filter but on the speed of the film as well. Although some photographic manufacturers give the multiplication factors for their filters with great accuracy, and speak of 1.3 and 1.7 times the exposure, we can cheerfully ignore the fractions and read the next whole number. For in the first place it is difficult to calculate with fractions and, secondly, the latitude possessed by any modern film is quite able to cope with any small degree of over-exposure which may result from our approximation.

Using a Red Filter

When photographing a landscape, it often happens that the bright blue light which comes streaming in from the space between the foreground and the sunny distant scene prevents objects in the distance from being seen clearly in the picture. The outlines are there all right, but they are

smothered by the lively blue rays of light. Where our eye could see land distinctly in the distance, the finished print shows nothing there but a white haze

Now if we put an orange filter, or, for an even stronger effect, a red filter in front of the lens, this blue light can no longer find its way into the camera These filters let through only red, or at the most, orange light The result is that distant hills and rocks and snowy mountains which would otherwise have been lost in the mist are clearly reproduced in the photograph

Of course this improvement in the distant view has to be paid for, and paid for dearly. A red filter requires a six- or ten-fold exposure, or a correspondingly larger aperture. So if your exposure meter gives you 1/200 second for a given stop, you must, if you are using a red filter, allow 1/25 second even in the most favourable circumstances Or else you must make a corresponding increase in the size of aperture, using, that is to say, stop 4 instead of 11.

Even an orange filter requires three to four times the normal exposure to be given (or an equal compensation from the size of aperture) For in either case, you are trying to make do with the light rays which remain over after the filter has taken its share Since the remainder consists almost entirely of red light, panchromatic material is, of course, essential Ortho emulsion would not register the red rays falling on its surface

By giving a considerably longer exposure, say, four times the normal time, or by using an aperture only two sizes bigger, one can obtain with panchromatic material and a red filter sham moonlight effects in broad daylight an inky-black sky, walls of a ghostly white, and heavy, velvety shadows If you decide to try these artificial night effects see that the sky is cloudless and that the usually welcome figures in the foreground, people, cars, dogs and so on, are conspicuous by their absence They would spoil the midnight atmosphere.

FILTERS, THEIR EFFECT AND USE.

Filter Colour	Material	Light	Factor	Blue Objects Appear	Green Objects Appear
None	Ortho	Day	1 ×	Very light	Dark
Light Yellow	Ortho	Day	2 ×	Rather light	Dark
Medium Yellow ..	Ortho	Day	3 ×	Light	Normal
Dark Yellow	Ortho	Day	4 ×	Normal	Light
None	Pan	Day	1 ×	Light	Dark
Light Yellow	Pan	Day	1.5 ×	Light	Rather dark
Medium Yellow	Pan	Day	2 ×	Normal	Normal
Dark Yellow	Pan	Day	3.5 ×	Dark	Light
Light Green	Pan	Day	3 ×	Normal	Normal
Dark Green	Pan	Day	4 ×	Rather dark	Light
Light Orange	Pan	Day	4 ×	Dark	Normal
Orange ..	Pan	Day	5 ×	Dark	Dark
Red	Pan	Day	8 ×	Very dark	Very dark
Blue	Pan	Day	1.5 ×	Light	Normal
None	Ortho	Half-watt	1 ×	Normal	Normal
Light Yellow	Ortho	Half watt	2 ×	Normal	Normal
None	Pan	Half-watt	1 ×	Normal	Rather dark
Green	Pan	Half-watt	4 ×	Normal	Normal
Blue	Pan	Half-watt	1.5 ×	Normal	Rather dark

This table intends to give a generalised survey of the various filters for the amateur as more often than not a certain effect is aimed at instead of a true rendering

As an alternative refer to the FOCAL FILTER CHART for filter effects.

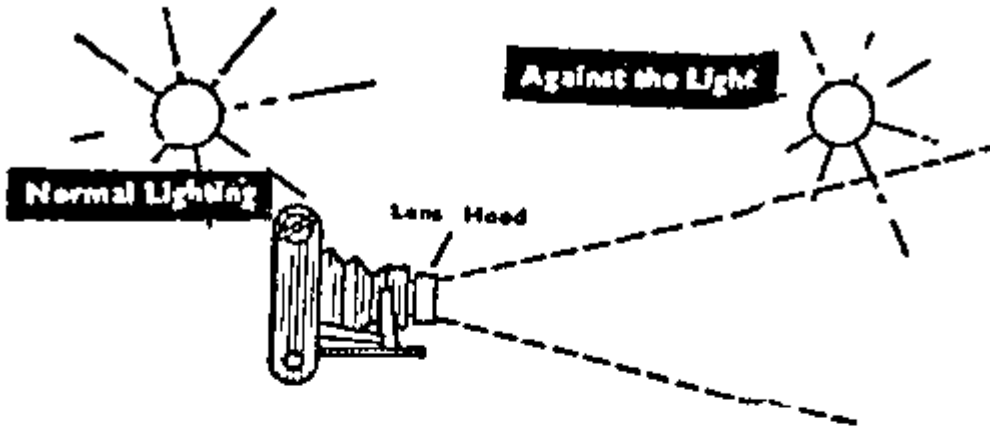
Yellow Objects Appear	Red Objects Appear	Field of Application of the Filter	Remarks
Dark	Very dark	——	Under corrected
Rather dark	Very dark	To eliminate haze to improve colour rendering in landscapes, etc	Slightly under corrected
Normal	Very dark	To produce colour-correct pictures of flowers, landscapes clouds	Correct
Light	Dark	For heavy cloud effects darkish sky eliminates atmosphere in landscapes	Over corrected
Normal	Normal	——	Under corrected
Normal	Normal	To eliminate haze to improve colour rendering	Slightly under corrected
Normal	Light	To produce colour-correct pictures of flowers landscapes cloud-effects distant work	Correct
Light	Very light	For heavy clouds darkish sky atc	Over corrected
Normal	Normal	For true colour rendering including red	Correct
Normal	Dark	As Light Green but emphasizes blue and red	Over corrected
Normal	Light	Effect filter rendering sky darkish emphasizes clouds and far distance	Over corrected
Normal	Very light	As Light Orange but slightly increased effect	Over corrected
Normal	Very light	For dramatic effects almost black sky moon-effects in day light	Over corrected
Rather dark	Rather dark	To make blue sky print as white Makes pan film behave like non-colour sensitive material	Under corrected
Rather dark	Very dark	——	Under corrected
Normal	Very dark	Gives fullest possible colour correction	Correct
Normal	Light	Good corrected	——
Normal	Normal	Gives fullest possible colour correction	Correct
Normal	Normal	Gives almost full colour correction with minimum of exposure increase	Correct

The fact that a filter is termed Correct does not mean it is the most useful one of colour-values in black and white

filter factors and ready exposure values with any material or make of filter

SOME TECHNICAL REFINEMENTS

Pictures Against the Light Are Effective



An important point to be considered is the position of the sun in relation to the camera

If it shines from directly behind the photographer's back, objects are illuminated bang in front, and the result is a flat, shadowless picture which is rarely pleasing Black and white representation of objects depends for its effectiveness on the interplay of light and shade

Even side lighting gives better results, for it casts powerful shadows and gives things depth and "body" Foreground and background which, with back lighting seemed to lie on top of each other, are now clearly separated

But the most beautiful effects of all are produced by taking the picture against the sun, that is with the sun in front and to one side, or even right in front of the camera Of course, one must not exaggerate and allow the light to shine straight into the lens This would only produce ugly halation effects on the emulsion of the film and details would be blotted out by unwanted circles

But apart from this extreme case, against the-light methods give excellent results Long shadows lie alongside patches of brilliant sunshine Everything is beautified by a shining halo round its edges Sometimes the light between

the near foreground and the distance, with its millions of light-reflecting dust particles, seems so solid that one could grasp it. It is remarkable how the most unpromising subjects—depressing suburban streets, for example—can be transformed and beautified by working against the sun. Then there are other subjects, such as the maze of tree trunks and masses of foliage in a forest which are simply unthinkable as photographs by any other than against-the-light methods.

Since the light comes at such an acute angle from in front of the camera, it is essential to use a *lens-hood*. It is fixed on to the camera in front of the lens, which it protects from the glare of the sun, just as we protect our eyes by shading them with one hand. The lens-hood also serves as a protection against the bright glare from things in the foreground. If there is a shady spot handy, such as a doorway or arch, under which you can stand while you are taking the picture, you can, of course, dispense with the lens-hood; your whole surroundings are acting as a protection for the lens.

Expose Accordingly

Since in against-the-light pictures things are attacked from their shady side, the exposure must be full. Otherwise the shadows will be pitch-black and show no detail at all. In cases like this the exposure meter, usually so reliable, must be used with great caution It is apt to take its cue from the brightest rays of light which sneak past the dark shadows and indicate an exposure which would be far too short fo the shadows So the meter must be pointed towards th shadow, and the effect of the bright sky must be reduce by shading the instrument with one hand while taking th reading

Another necessary precaution is to take the exposur measurement nearer to the object than to the camera, l

order to avoid a falsification of the result by one or two bright spots The reading obtained in this way is usually from 1/50 to 1/100 second with stop 5 6, using a film with a speed of about 27 degrees Scheiner Judged by the effect produced on the naked eye, the figures seem rather high, but in fact they are fully justified by the actual conditions

Of course it is quite a different matter if no detail at all is required in the shadows in the foreground In this case the exposure is measured from the brightly-lit background The meter will show an exposure of 1/100 or 1/200 second, and this with stop 8 In the finished picture the foreground will be dark and devoid of detail and behind it the landscape or cloudy sky is brightly-lit and rich in detail An inn sign, seen from the street below, or a monument standing in a sunny street, or a cross such as one sees sometimes in the fields in France, outlined against the line of blue hills—these and similar subjects are ideally suited for against-the-sun silhouettes.

A small aperture, together with focusing at 25 feet, gives you " near to infinity " (see page 33) and ensures a sharp definition from the near, dark foreground right up to the bright distance, should this depth of field be required

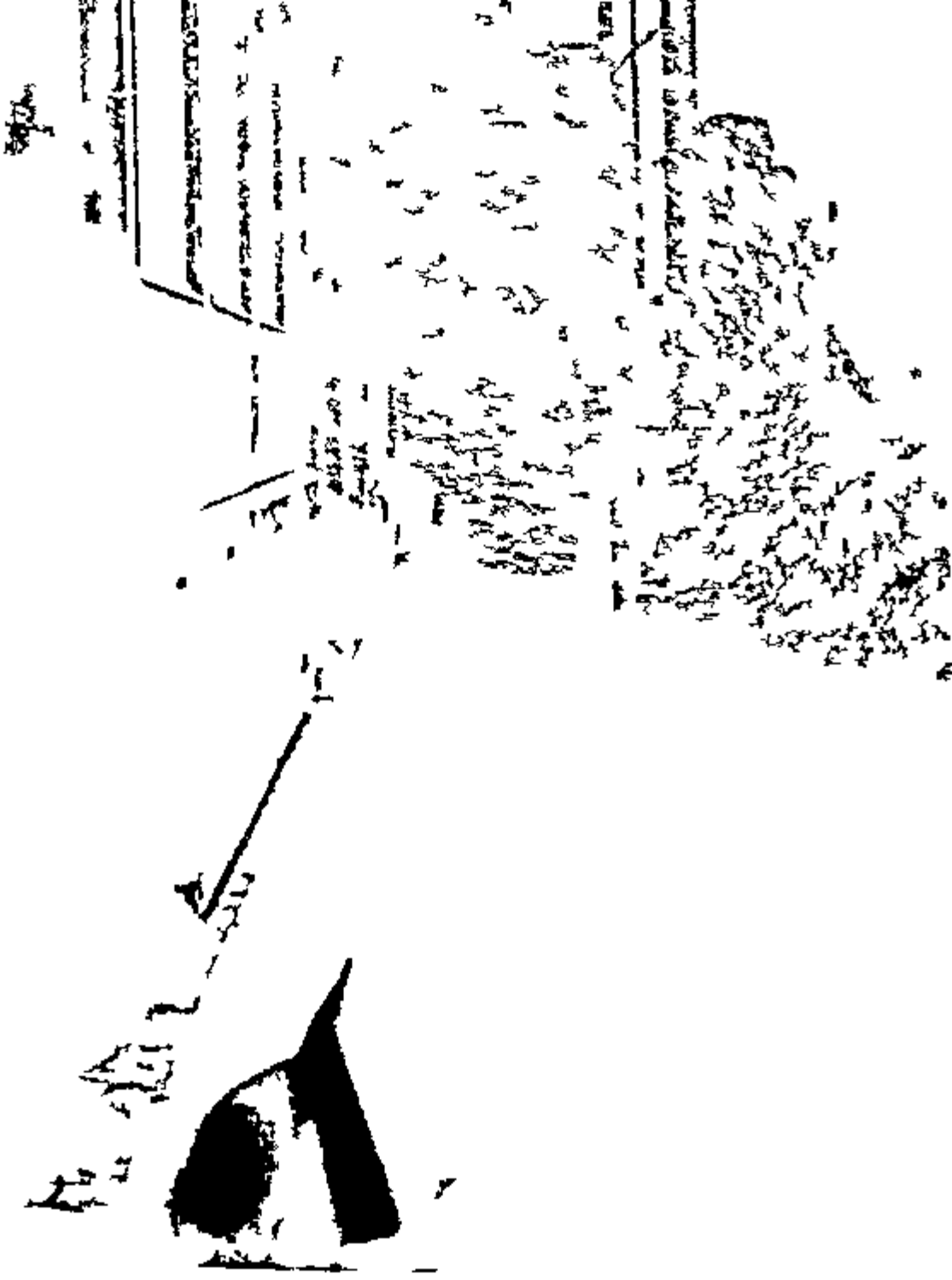
The method already described can also be used for colour snaps (page 121) for which against the-sun methods are otherwise of little use Here again the foreground is taken in silhouette. The exposure time is measured from the brightly-lit parts beyond In the picture the foreground stands out dark and sharply outlined against the coloured distance

Soft Outlines

The lens maker has taken a great amount of trouble to ensure that his lenses produce an image which is as sharply defined as it possibly can be. Needle sharpness is not always

THE EFFECT OF A FILTER the photograph on the left was taken on pan film and shows an almost empty sky—the photograph on the right was taken immediately afterwards under exactly the same light conditions but with a medium yellow filter producing a dramatic cloud effect. (See pages 68 70) On the left the stop was f 12.5 On the right f 9 The exposure time on both occasions was 1 50 sec.—Photographs by W D *Emanuel*

A RED FILTER has he e produced a moonl ght effect although the p cture was taken in bright sunlight. (See pages 70-72.) The exposure was 1 25 second although normally without a filter using the same pan f lm on y 1/200 second would have been required —Photograph by *Kodak.*



AGAINST THE LIGHT The deep shadows pointing towards the camera the g tte ng l ght contours the lively contrast between black and white create the depth and special charm of this picture (See pages 74-76) It was taken with stop 5 6 and 1/25 second.—Photograph by *A. Neuland*

THE SOFT OUTLINES of the composition have been achieved by using a soft focus attachment. The effects can be clearly observed especially by the way the lights are spread giving a peculiar sparkle. Note how the high lights stand out. (See pages 76–78)—Stop 4.5, 1/25 second—Photograph by *G Ramhab*

equired, however. It is occasionally preferable to produce oft pictures. This is especially true where " atmosphere " s wanted.

Now " soft " must not be confused with " out of focus." You will never get the softness of outline and the gentle merging of tones by focusing your camera inaccurately. You can obtain what are known as " soft-focus " lenses, which, with a large aperture, give soft pictures without any further ado, but these are not worth while for the average amateur photographer.

There are, however, simple appliances which can be fixed in front of the lens and which produce the same result. That is, they soften the hardness of outlines and tone down extremes of light contrast by diverting to some extent the path of the rays which fall upon the lens. There is, for example, a lens which consists of a flat glass disc bearing concentric rings. Light falling in the flat parts of the disc is undisturbed, and goes to form a sharply-defined image on the film. But the light rays which come into contact with the fluted portion are diverted from their direct path The result is two images very close together. The second one, produced by the rays of light which have been pushed aside by the raised portions of the glass disc, is less sharp than the first. Together they form a well-defined, yet softened image of the model, in which the edges of the dark portions are lit by the neighbouring bright areas. The whole picture is diffused with a soft radiance Common things are transformed and beautified in this bath of light. Sun-bathed landscapes taken against the light with the help of such a lens give pictures of real beauty.

When the subject is poorly lit a soft focus attachment is not a practical proposition, since it has the effect of toning down light contrasts In any case it is a thing to be used sparingly and with discretion.

When using such a soft focus device, it must be borne in nind that its effect is lessened by reducing the size of aper-

ture, the reason being that the fluting exerts less influence on the image if the stop is small The aperture should not be smaller, therefore, than 5 6 If a very pronounced degree of softening is required even the 4.5 stop is not too large, even if light conditions would otherwise justify a smaller aperture.

HINTS AND TIPS

The Lens-hood

You can now get metal lens-hoods, which are of adjustable length, and which can be suited to any requirements Sometimes they are telescopic, or else composed of a number of single laminae, like the diaphragm inside the lens

If you have forgotten the lens-hood, you can easily make one from a bit of cardboard shaped into a tube and stuck down the side But the length must be carefully calculated or the view will be blocked

Soft Focus

Caution is advisable when using soft focus effects When special soft focus lenses are employed at full aperture, you run the risk of getting a woolly picture

If cross-patterned gauze is stretched across the lens, to produce soft focus effects, then any source of light appearing on the photo will show cross- or star shaped light-patterns This might be amusing once in a while, for instance above the candles of a Christmas tree, but it never looks natural

If desired, you can add soft focus effects subsequently, i e , when enlarging, by stretching the soft focus agent across the enlarging lens This, however, is apt to produce a somewhat depressed effect, as against the cheerful soft focus of the actual snap The snap shows the bright over-tones of the high-lights, while the enlargement stresses the preponderance of the shadows

COMPOSING THE PICTURE

Upright or Oblong?

The quickest answer to the question is to recommend the square shape For one thing you no longer have to decide whether to hold the camera upright or on its side, since both dimensions are equal, and secondly, the choice as between an upright and an oblong picture can be made subsequently, and the desired section cut out, that is, if you decide not to keep the original square This square shape, which used to be considered entirely impossible, has now become quite familiar, thanks to the modern reflex camera

The case is altered if your camera is rectangular Here you must examine your subject carefully before deciding whether it will make a better photo, whether it will fit in better, in one way or the other This is true especially for the smaller, handier sizes of camera, when enlargement is not contemplated If the prints were to be reduced in size by cutting out a section of the required shape, the result would be too much like a postage stamp

Some subjects immediately suggest the shape of the picture a person, a tower and similar subjects will be taken with the camera in an upright position, a group of people or a landscape will suggest the oblong shape

Sometimes, as far as the view itself is concerned, there is nothing to choose between the two shapes The question then arises as to what particular aspect of the scene is to be emphasised Let us imagine that we are taking a picture of a lake Do we want to fix on the paper the picture of the great expanse of water, with its sailing boats on the surface and the long line of hills on the opposite bank, or are we chiefly interested in the sky with its masses of cloud towering above the shimmering water ? In the first case we choose

 (1) oblong → focus

an oblong; in the second, an upright picture to give the desired effect. And so it is with a great number of subjects: it is less a question of mere reproduction, it is a matter of interpretation, too.

Tilting the Camera

Tilting the camera must not be confused with holding it crooked Twisting it round its longer axis will have the result of making the horizon look crooked and water flow uphill It will make towers lean to one side, although they are in London or New York and not in Pisa. Now this is a serious matter if you are going to make contact prints from your negatives But if you are going to make enlargements, the defect can be partly remedied and leaning towers will regain their equilibrium

But by tilting the camera we mean pointing the lens upwards towards the sky or downwards towards the ground If we say the camera is crooked, we mean that it is by inadvertence If we say it is tilted upwards or downwards we mean that we do it on purpose

In bygone years every self-respecting camera used to be provided with a spirit level This appliance was as indispensable to the camera's equipment as the trenching tool is to the kit of the infantry soldier. One used to gaze earnestly through the glass cover at the fidgety little air bubble until it settled down exactly in the middle of its oil bath, in order to be quite sure that the camera was perfectly level Nowadays spirit levels have all but disappeared from cameras, and so has the fear of pictures taken at an unusual angle

The modern photographer has no scruples about tilting his camera upwards or downwards just as it suits him, without worrying about the slight degree of distortion it causes. If necessary he will get down on his knees so that

A SQUARE PHOTOGRAPH can eas ly be turned into an upright or an oblong one as s shown n the p cture above How different shape and contents of an upr ght and an oblong picture can be although taken of the same scene w ll be seen by covering a part of the whole once along the vertical and then along the horizontal white l ne (See page 83)—Photograph by G Szekely

BY TILTING A CAMERA upwards we may get a slight degree of distortion but at the same time we make our subjects stand out clearly against the sky thus emphasising their individual shape (See pages 84 89) This picture was taken with stop 8 1/50 second on panchromatic film and with a light green filter —Photograph by G Gesell

THE BIRD S EYE VIEW gives the camera a w de outlook o er masses of people or things It is the right viewpoint from h ch to catch art st c composit ons in the everyday th ngs of l fe (See p ges 89 90) This picture taken on a very dull rainy afternoon was exposed 1/25 second at stop 5 6 —Photograph by T Gremmler

I wonder what it s l ke inside ?

How interesting!

Wonder what the pedals are for ?

SHOOTING A WHOLE SERIES o p ctures of some amus ng situation especially of children or an mals enables pract cally everybody to make photo-stories of the type nowadays so popular w th the llustrated magazines (See pages 92 93) These pictures were taken on panchromatic film with stop 5 6 and 1 50 second —Photographs by G Gesel

his model stands well above his lens. The background, with all its disturbing and distracting details, sinks out of sight, while the principal subject of the picture remains in undisputed possession of the field of view. That market-cross or equestrian statue, that rather ordinary group of tourists, the physical-culture expert doing a hand-stand on the parallel bars—all of them will gain in impressiveness when they are made to stand out against the sky. If there are some handsome clouds in the sky, they will be a welcome addition to the picture. If, on the other hand, the sky is cloudless, whether brilliantly blue or uniformly grey, it will be just as effective as a background. In the latter case the person looking at the picture may not even realise that it is the sky.

This makes a yellow filter indispensable, in order that the sky may not appear as a monotonous expanse of white, but has a good "solid" grey tone. In using the exposure meter you must be careful not to measure the bright light coming from the sky, but the light reflected from the principal object in the picture, which is much darker in tone.

When the camera is tilted in front of buildings the resulting picture will show what are known as "vanishing lines." These serve excellently to emphasise the powerful upward sweep of the architectural feature. But if these lines are not wanted, they can in many cases be corrected subsequently during the enlarging process by the method described later on in this book. (Page 210.)

The Bird's-Eye View

Extensive subjects containing a mass of detail, such as a beach with its merry host of holiday-makers, a town-square with its traffic, a flock of grazing sheep, and so on, are best taken from above People and things which, seen from the same level, would present the appearance of a confused

mass now sort themselves out into small individual groups and can be much more easily recognised The observer s eye wanders pleasantly from detail to detail, covering the whole ground progressively

So shots from above are the exact opposite to shots from below, not only in the method employed but in the results obtained Whereas the upwards tilt purposely isolates single individuals or solitary objects by taking them out of their surroundings the view from above, the bird s-eye view, deliberately includes a multitude of things in the picture

If you think of getting a picture of the crowded street scene choose your perch on the top of a building or tower The village with its few score houses clustering round the church can best be taken from a neighbouring hill top For other objects a doorstep, a park seat, or a table will give the desired viewpoint

Exposure is an easy matter, since the sky and distance which, as a rule are much brighter than the subject itself are automatically cut out from the picture by pointing the camera downwards The field of view therefore is uniformly illuminated so that the photographer can get an accurate estimate of the lighting from his exposure meter without any further trouble Moreover, the depth of the field required is far less than in the case of pictures including near objects and a distant background both of which should be more or less sharply defined

Here as in other things we must not exaggerate It is true that people and vehicles taken almost vertically from above may sometimes look quite amusing owing to the foreshortening which takes place And if long shadows are present, as happens in the early part of the morning or late in the evening the results can be most effective sometimes even, grotesque But apart from such exceptional cases a moderately tilted camera is to be preferred

when the shadows are not long

Small Section—Big Effect

Every photograph we take should fix an impression we have had of a particular thing at a particular time. To-day it may be the face of a friend, another day it may be a child at play, or a country scene that attracted us on our holidays. When, days or weeks or months later, we pick up the photograph and look at it, it should immediately—if only temporarily—take complete possession of our imagination, dismiss from our mind all thoughts of unpaid bills and other daily worries, and recreate for us the reality of yesterday. More than this, our photographs should be able to convey even to a stranger something of what we have felt and experienced.

But a magnetic influence of this kind can only proceed from a clear representation of the object, be it animal, person or place, which once gripped our imagination. "Clear" implies in this connection that the main feature fills the picture, that it is as big as possible, and that all useless frills, which would otherwise take up space, are left out. This small selection from the object should not include more than is necessary to suggest the real thing in an unmistakable manner.

The easiest way of emphasising the importance of the object is to go close up to it. The closer your camera is to the object, the bigger the picture of it will be, and the better the use made of the available space.

But we cannot always go up as close as we would like to the thing we want to take. There may be a fence or a moat in the way. Or if we are stalking people or animals, the former are apt to get self-conscious and the latter frightened or over-interested in the camera if we go up too close to them.

If our camera is adapted for interchangeable lenses we can substitute a long-distance lens or a telephoto lens for the one we use in the ordinary way. This will bring things nearer

without our having to go up closer to them With double the focal length any given object, taken from the same spot, will be twice as big on the film But this extremely helpful piece of apparatus can be used not only to bring distant objects nearer, but, even more frequently, to get a larger image than would be possible with an ordinary lens of things which are comparatively near

It is true that a long-distance lens makes the camera rather more difficult to use Even the slightest movement, which would not hurt a picture taken with a lens of normal focal length, is plainly perceptible on the enlarged image It is therefore inadvisable, if the camera is held in the hands to make snaps with a long focus lens at a longer exposure than 1/100 second. Moreover, it is more important to measure the distance very accurately than when using a lens with normal focal length, because the area of sharp definition is much shallower when a long focus lens is used

There is yet another way of securing the maximum effect This is to enlarge one small portion of the negative only, showing just that part of the whole which is wanted and no more The greater the amount of unnecessary detail that can be cut out, the greater the effect of the small remaining section

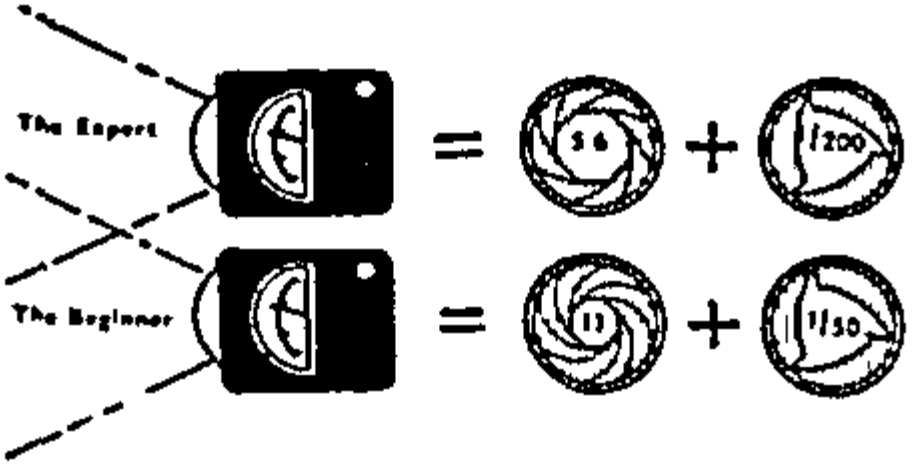
A Series of Pictures

If you possess a miniature camera you will be sure to want to make a series of photos Since you have 36 or even more exposures in one roll of film, and since each separate film only costs a penny you will feel less inclined to be too economical One or two exposures more or less do not make any great difference, so you can afford to use up several on the same subject. It often happens that the miniature film is almost completely exposed and you feel

like finishing it off so that you can see the results. In this case you will be more than ready to try a new method which involves the sacrifice of several exposures.

If the worst comes to the worst you can always choose the best negative for enlargement and throw the others away. But it is often worth while to place several snaps of the same subject next to each other. This is especially true for portraits of people or animals. The result is a kind of movie show, although perhaps not so dramatically alive as a cinema film. Only slight changes in expression or attitude are necessary to make another and different picture. And with three or four snaps of this kind you have your photo-serial.

The Question of Aperture



One difference among many between the novice and the expert is the way in which they choose their size of aperture, or stop The novice, who in many respects is fully entitled to the honourable name of photographer, stops down as far as he can go even if there is nothing to be gained from great depth of field For him no diaphragm can have a small enough aperture When reading his exposure meter he always chooses the very smallest stop consistent with the longest safe exposure His reward is to get an image on his film which is sharp from just in front of the camera right

up to the distant background He is insured against indistinctness—a danger for which he has a wholesome respect—and attains sharpness of definition even of the most insignificant, if not positively disturbing details One is inclined to ask why he bought himself a camera with a 3 5 lens if he was never going to open his diaphragm wider than stop 11

The expert goes about things in quite another way Where depth of field is essential, he, too, must use a small stop In all other cases, however, he uses a wide stop and profits by the improved lighting conditions to give a short exposure If the two of them, the novice and the expert are standing in front of the same object, the needle of their respective exposure meters will both of them tell the same tale Yet the expert chooses, say, stop 5 6 and an exposure of 1/200 second, whereas the novice, with his passion for great depth of field, stops down at least to 11, with the result that he is obliged to give 1/50 second exposure

Of course, the expert must in that case focus much more accurately than his neighbour, to ensure that his smaller depth of field includes everything he wants to get sharply into his picture And for that very reason his pictures are more interesting owing to the various degrees of sharpness they contain The essential feature be it man or beast or inanimate object, is clear and sharp and the mere incidentals, the tedious details in the background are suitably subdued Whereas the novice gets everything that happens to come within the range of his lens indiscriminately distinct, the expert chooses just what he wants and leaves out the rest

To sum up, it is often advisable to choose a larger aperture although its use entails extra care

DOING WITHOUT SUNSHINE

When the Sky Is Overcast

A great number of amateurs never, on principle, use their cameras in bad weather. They must have a clear blue sky and lots of sunshine. And if into the bargain they can limit their working hours to the period between 11 a.m. and 2 p.m. they are completely happy. And, of course, they make their unfortunate model, whether it is little Betty or old Uncle Charles, pose in full sunshine. Otherwise they would think that they were wasting good daylight. In fact, they go about their photography as if they were living in the year 1900.

But photography has made considerable progress since those days. For one thing films are very much faster than they used to be. The most sensitive emulsion then produced would probably be estimated nowadays at something like 16 degrees Scheiner, whereas modern films are up to forty times as fast. (Every additional 3 degrees represents double the degree of sensitivity.)

These modern films make it possible to take snaps, even if the sky is overcast, at 1/50 or even 1/100 second with an aperture which need be no larger than 4.5 or 5.6. And the pictures show better values than photos made in full sunlight. For not only is the exposure meter reading more reliable when the sky is overcast than when bright sunshine and dark shadows lie side by side (with the result that the meter is tricked by the bright portions into giving too low an exposure number), but the emulsion is better able to cope with relatively subdued light than with the violent contrasts of light and shade. The negative will be better balanced and will give a better positive whether it is put into the printing frame to make a contact print or whether an enlargement is made from it.

But the sun should not be completely hidden behind clouds When the model is small enough, when, for example, you are photographing a person, the shadow of a wall or a house will be quite enough to soften the extremes of light contrasts In any case, whether the subject is in the shade or whether the sky is overcast, the fact remains that the photo is taken out of the sun, and that it comes out—sometimes even very well

Even bad weather, with rain or snowstorms, will sometimes produce interesting pictures of objects which, on a bright sunny day, would not be worth taking If, owing to the comparatively lengthy exposure, say, 1/25 or even 1/10 second, the falling snowflakes or rain-drops, as the case may be, appear on the photograph like continuous streaks or lines, it is all to the good It makes the picture all the more effective

The Advantages of a Misty Day

In many respects mist produces ideal conditions for photography For one thing it destroys the colours, so that there is no necessity for films which are highly sensitive to colour, nor for filters designed to aid such colour sensitivity, in order to reproduce the varied tones of nature in their correct black and white values Nature, shrouded in mist, is already reduced to the required study in black and white It shows a wide range of greys which can be faithfully captured even by orthochromatic material, without any difficulty

Even the everlasting conflict between foreground and background which, in clear weather conditions, often spoils a good picture, is quickly settled in misty weather The middle distance and, especially, the far distance, step back of their own accord, since the farther things are away, the more densely are they shrouded in mist. So you focus on

MIST AND FOG have a charm of their own They give things a mysterious dramatic appearance but demand a fairly long exposure (See pages 96-97) At stop 6.3 this picture was exposed 1 second naturally with the camera f xed on a tripod —Photograph by O R. Croy

IT LOOKS LIKE AN INSTANTANEOUS EXPOSURE but it is not. The photographer cleverly waited at a bus stop until the traffic came to a standstill for a few seconds. The slight mist helped to spread the light all over the scene. (See page 103.) The exposure time was 2 seconds at stop 4.—Photograph by *Ewald Gnilka*

the objects in the foreground and you can dispense with great depth. This means that a large aperture can be used. And if the distance is somewhat hazy this will not be attributed to faulty focusing but to the influence of the mist. It is, however, important to have some suitable objects, such as trees, persons, vehicles, in the foreground to emphasise the stereoscopic effect between the clear details near the camera and the gradually receding distance.

Pictures of misty scenes are especially effective if they are taken against the light, for colours are then entirely suppressed. The resulting silhouette effect combined with the various tones of grey produces a sense of distance such as no other method can give. Moreover, thanks to the mist, harsh reproduction and halation from direct light on the lens, which are common dangers with against-the-light pictures, are excluded.

The electric exposure meter, which in any case is wholly reliable only between the two extremes on the scale, has its task made much easier by the lack of contrasts which prevails on a misty day. Contrary to the usual practice, exposure must now be reckoned, not from the shadows, as in sunny weather, but from the lighter background. This makes the nearest objects very dark, in fact, under-exposed, but this is just how we see things with our eyes, the light curtain of mist in the background causing things close to us to look black by comparison.

Pictures taken in the mist at night are especially beautiful. The very atmosphere is luminous in the light from shop fronts or street lamps. People and things loom up black against the white wall of mist. The film for this work must be panchromatic. Of course the usual requirements for photographs by night, such as a highly sensitive film, the largest available aperture, and so on, must be satisfied. The exposure can be ½ second or even 1 second; any slight blurring due to movement will not spoil the picture. It will be taken to be the effect of the mist.

Time Exposures by Night

There are hundreds of opportunities for making this kind of picture It may be the town, blazing with street lamps, and electric signs, or a village, dimly lit by the feeble gleam of an old-fashioned gas lamp Both provide excellent material Tomorrow, perhaps, or next week, some public building will be all lit up in honour of some civic celebrations, or a famous monument will be floodlit. Subjects of this kind sometimes give amazingly beautiful pictures So it is well worth while taking out your camera sometimes even at night, for the technique is not so difficult as might appear at first sight.

If the subject of the picture is fairly extensive, it will rarely be illuminated brightly enough to allow of an instantaneous snap You will need a tripod—and a little patience The former can occasionally be dispensed with, that is, if there happens to be a convenient wall, or other firm support, on which the camera can be rested

A large aperture is not important, since the exposure can be as long as is required Even a simple box camera, therefore, will produce pictures by night. Nor need the film be extra fast. It must, on the other hand, be panchromatic, because artificial light is rich in the red and yellow rays which influence panchromatic emulsion On orthochromatic film the picture would be lacking in detail.

As for exposure, one can vary it within very wide limits One or two minutes extra will not do any harm At the most the additional exposure will alter the character of the picture. If the length of exposure is greatly exaggerated, the night effect is lost; the picture might just as well have been taken in broad daylight. Too short an exposure, on the other hand, will produce all night and no picture. On page 103 the reader will find a table giving suitable exposures for photos by night.

If you possess a lens-hood you should by all means use it. For lens hoods are not only for protection against the sun,

but are useful in all cases where bright lights and dark shadows are found side by side. People passing in front of the camera will do no harm, since their impression on the emulsion in that short time is too weak to be visible.

The lights of passing cars or bicycles, however, are dangerous. The remedy is to put your hat over the lens to protect it until the vehicle has passed. In doing so, you must be careful, of course, not to move the camera.

And Now Snaps by Night

High-speed film (about 32° Scheiner), panchromatic emulsion, and the widest possible stop (2.8, or, better still, 2) are, of course, essential. The high sensitivity entails a certain amount of grain in the negative, but it can't be helped. And the wide stop—and here one is even more helpless—is bound up with small depth of field.

But in any case, modern miniature cameras take in a deeper belt of sharp definition than others, and are therefore specially suited to work of this kind. Another of their advantages is that they often have a built-in distance meter which at any rate enables you to get all the available sharp definition area where you want it most. You naturally focus on the objects nearest to the camera, because they, at all costs, must be sharp. The fact that the background will then be out of focus is even less objectionable in this case than in daylight pictures. In fact it adds valuable "atmosphere."

Despite the wide aperture and high-speed film, you must be prepared to give a relatively long exposure: 1/10 or even 1/5 second, which means that the picture does not strictly belong to the "instantaneous" class, in which the slowest shutter speed is really 1/50 of a second.

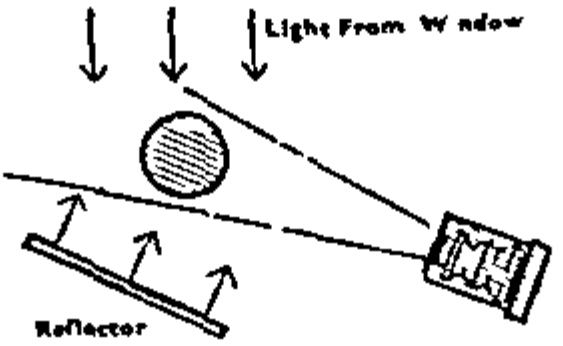
It is, therefore, out of the question for most people to hold the camera still without help of some kind. What is sometimes known as a chest-pod (or neck-strap) will overcome

this difficulty With the help of this device it is possible to keep the camera steady for exposures up to one second, provided the photographer is not an abnormally excitable person But, besides this there is often the possibility of steadying the elbows on some convenient railing or balustrade. It may not be considered elegant but it is quite an effective way of keeping the camera steady Or else, you stand up with your back to the wall (literally), quite stiff as if you were a human camera stand, press your elbows and your camera close to your body and open the shutter while you hold your breath

Of course you must wait until any mobile elements in the field of view are as still as possible, so that the long exposure will not entail blurred outlines In this way you will be able to create faithful "documentary" pictures of the streets by night, lit with the glare of street lamps, shop windows and electric advertising signs Even if your first experiments result in failure, they will teach you enough to make subsequent attempts completely successful

To make pictures in the theatre, the music hall or the circus you must observe the same rules as for night photography outside As the exposure must be short, you must compensate for it in other ways The fastest film possible and a wide aperture are more than ever essential, because the movements on the stage, especially in the music-hall or in the ring, are apt to be pretty rapid so that a longer exposure than 1/50 or 1/100 second is out of the question Even on a well lit London West End or New York Broadway stage there is only just enough light to leave an image on the emulsion, which will be strong enough, given careful development, to produce a worthwhile picture.

Night photography is a matter of experience Photographers producing brilliant pictures of night scenes are mostly very well acquainted with the lighting conditions of the place in question So do not expect to succeed in this field at the first shot.



Even the brightest room is considerably darker than one would at first imagine. When we come in from the outside our eyes, though dazzled by the sunshine, soon adjust themselves to the inner gloom, so that we see things much more brightly illuminated than they really are Our brain comes to the help of our eyes. Yet incorruptible devices for measuring light have proved that only one three-hundredth part of the brilliance outside gets into the middle of a normal living-room.

If the photograph is of the room itself or of motionless objects in the room this meagre illumination will be quite sufficient You can stop down as much as you like, to get the required depth of field, for if the camera is supported by a tripod or a table, all you have to do is to leave the shutter open long enough to allow the weak rays of light to influence the emulsion of the film in your camera As to how long to leave the shutter open, your exposure meter will tell you On page 117 we explain a little subterfuge designed to help the exposure meter to do its work, even under the unfavourable conditions prevailing in a (photographically speaking) badly-lit room

Near the window the light is much more intense, eight to ten times as strong, in fact, as in the middle of the room So portraits should be made with the model near the window This position will allow of an exposure somewhere between 1/20 and 1/2 second, for as no great depth of field is required, a larger aperture can be utilised

One problem raised by portraits taken near the bright light from a window is how to relieve the dark shadows on the other side If the model can be placed in a window recess the shadows are considerably lightened by the fact that light streams in on three sides It may even be possible to arrange for light from a second window, even at some distance, or the reflection from a white wall to relieve the shadows on the dark side

Since hard lighting is particularly unsuitable for faces it is a good plan to arrange things so that a book or a white tablecloth acts as a reflector and helps to illuminate the dark side of the sitter's features Or finally, as shown in the diagram, a screen can be erected at some distance from the model—a large white cloth, for example—to provide the highly desirable, in fact essential, lighting for the shady side

HINTS AND TIPS

An Aid to Focusing

Correct focusing is often difficult under bad weather conditions or in a dim room, whether your camera is fitted with a ground glass screen or a distance meter A leaf from a tear-off calendar with large figures, held or stuck up at the correct distance, will help you to focus exactly.

A Use for your Umbrella

You may not like carrying an umbrella about with you, but it is a very useful article for snaps taken in the rain Not so much because it keeps you dry, but because it protects the lens in the absence of a lens-hood

If you have a companion with you who is kind enough to hold the umbrella, leaving both your hands free to hold the camera by all means accept her kind offer of help

Night

You need not necessarily wait until it is pitch dark. Dusk is a more comfortable time of day and will give you night effects without necessitating a too lengthy exposure.

Effective studies of picturesque corners and narrow streets can be made by using the headlights of your car as illumination. The exposure, with a small stop, will require from 2 to 4 minutes.

So, to spare your accumulator, you let the engine run with plenty of gas, so that you get a good supply of light. Of course, you must not rest the camera on the trembling bonnet of the car. In fact, your tripod should be well away from the effect of the vibration.

A USEFUL TABLE

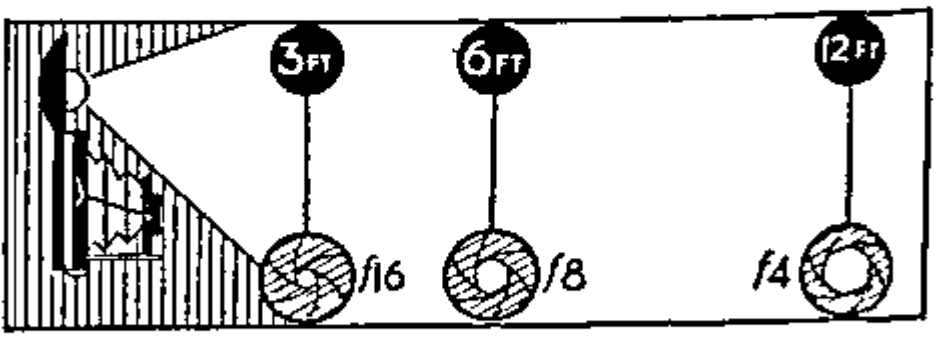
EXPOSURE TABLE FOR NIGHT-PHOTOGRAPHS

Subject	Pan film speed	Aperture f/2 or 2.5	f/2 or 3.5	f/4 or 4.5	f/5.6 or 6.3	f/8 or 9	f/11 or 12.5
Moderate Lighting: e.g. Provincial town with street lights	29° Sch.	4 sec.	8 sec.	16 sec.	30 sec.	1 min.	2 min.
	32° Sch.	2 sec.	4 sec.	8 sec.	16 sec.	30 sec.	1 min.
Better Lighting: e.g. Station, Factory in night shift, etc.	29° Sch.	2 sec.	4 sec.	8 sec.	16 sec.	30 sec.	1 min.
	32° Sch.	1 sec.	2 sec.	4 sec.	8 sec.	16 sec.	30 sec.
Bright Lighting: e.g. Well-lit city streets with electric advertisements	29° Sch.	1 sec.	2 sec.	4 sec.	8 sec.	15 sec.	30 sec.
	32° Sch.	1/2 sec.	1 sec.	2 sec.	4 sec.	8 sec.	16 sec.
Brilliant Lighting: e.g. Floodlit building lighted shop windows, etc.	29° Sch.	1/10 sec.	1/5 sec.	1/2 sec.	1 sec.	2 sec.	4 sec.
	32° Sch.	1/25 sec.	1/10 sec.	1/5 sec.	1/2 sec.	1 sec.	2 sec.

Half the exposure times given in this table is needed on wet or snow-covered ground

ARTIFICIAL LIGHT

Flashlight



With flashlight you can dispense with daylight altogether You are no longer dependent on the sun, or a window indoors You carry your own private sun with which you can illuminate your subject at any time and place, at home, at your friend's house, or an evening at a party

The flash-bulb resembles an electric light bulb, but it lights up for only a fraction of a second—a flash You take your pictures by this flash

The flash-bulb is inserted in a battery case, and the current of the battery is used to set off the bulb A reflector behind the bulb makes sure that all light is directed toward the subject The flashlight is instantaneous, it lights up for about 1/40 sec. Each flash-bulb can be used once only The light is so strong that you can generally use quite a small aperture

You can put a diffusing screen in front of the bulb to soften the light, too

There are several ways of using flash with the camera. The simplest is the "open flash" method You need a flash-bulb in a battery case with reflector You set the camera at the correct distance, the shutter to "B" and place it on a firm support or a tripod

SUNSHINE INDOORS a quiet corner and a pleasantly restful picture The light cover of the easy-chair helped a lot to spread the light all over the scene (See page 105) The shot was taken at stop 4 5 with 1/100 second —Photograph by *Delvine*

TWO PHOTOFLOOD LAMPS one placed in the fireplace and hidden by the easy chair to create the impression of a burning fire and give contrasting outlines to the figures the other placed to the left of the camera to illuminate foreground detail The camera was held in a very low position to emphasize the group against its surroundings — Photograph by *W E B Ring*

A FLASH BULB helped to capture this completely natural and candid party shot The flash bulb in its flash holder was fixed to the camera and fired by the camera shutter The instantaneous exposure dispensed with any need for posing and even managed to cope with a certain amount of movement A fast pan film was used Stop 5 6 1/50 second exposure —*Photograph by Douglas Fulford*

HIGH SPEED FLASH and real t m ng on the release button Stopping fast movement needs h gh shutter speeds and an accurate flash syn chroniser to make sure that the shutter and flash go off together This shot at 1/1000 second catches all the exc tement of bouncing on the bed yet shows the subject perfectly sharp The exposure was made on fast pan f lm at stop 11 —Photography by *Ha old M Lambert*

To take the picture, open the shutter, fire the bulb (by pressing the battery case switch) and close the shutter immediately. You regulate the exposure by the lens stop, according to the distance between flash-bulb and subject, and type of bulb used (see table on page 114)

The intervals between opening of shutter, releasing of flash-bulb and closing of shutter should be as short as possible to avoid blurred images This is particularly important for flash pictures taken by day or in a very well-lit room. You can keep ordinary room lights burning, but don't let them shine directly on to the lens.

Many modern camera shutters are fitted with flash contacts With such a camera you connect a cable from the battery case with flash-bulb and reflector to the flash contacts of the shutter On releasing the shutter an electrical circuit is automatically closed when the shutter is fully open, setting off the flash-bulb at this very moment. This method has appreciable advantages The flash holder can be connected with a bracket to the camera so that camera and flash form one unit, the shutter may be set to instantaneous (e g , 1/25 sec) and the camera held in the hand

Shutters which are not originally synchronised can, of course, be so converted any time Alternatively, you can use a flash attachment with a mechanical synchroniser The mechanical synchroniser screws into the cable release socket Depressing the plunger of the synchroniser will release the shutter and fire the bulb

Shutter Speeds and Apertures

Slow and average movement can be photographed even with the " B " setting and " open flash " method as the duration of the flash is only about 1/40 sec You can use up to 1/100 sec if your shutter has built-in flash contacts and you use quick-firing flash-bulbs which take only about 1/200 sec to light up (e g , Speed Midget bulbs) Other

bulbs—generally they take about 1/50 sec. to get goi
should be used with a shutter speed of 1/10 to 1/25 se
ensure that their full brightness coincides with the
opening of the shutter

Here are the apertures to use for some of the m
common flash-bulbs If used in an efficient reflector
room of average brightness with shutter speeds up
1/50 sec. and an ortho or pan film of 29–30° Sch

APERTURES AND FLASH-BULBS

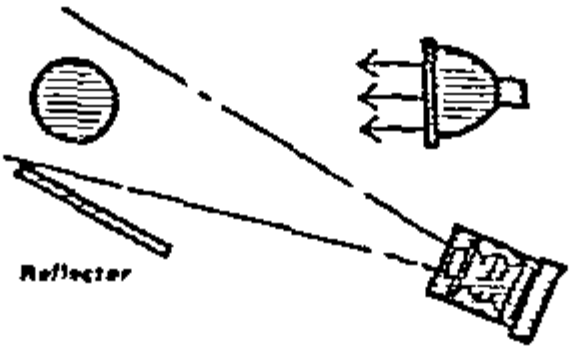
Distance (ft.)	*G.E.C. or Mazda S.M. Philips PF5 and PF 3N*	*Philips PF 14*	*Philips PF 25 Mazda No 5*	*Philips PF G.E.C. No*
5	f18	f25	—	—
6	f16	f22	f32	—
8	f11	f18	f25	—
10	f 9	f12.5	f18	f25
12	f 8	f11	f16	f22
15	f 6.3	f 8	f11	f18
20	f 4.5	f 6.3	f 9	f12.5
25	f 3.5	f 5.6	f 6.3	f11
30	—	f 4.5	f 5.6	f 9

In bright rooms (kitchen bathroom) or with fast 32–3
Sch pan film use next smaller aperture In very large roon
at night outdoors or with 26° Sch film use next larger sto

Electronic Flash—which we should mention in passing-
is a light source rather similar to flash bulbs but uses
special flash tube which lasts for at least 10 000 exposures
the flash duration is between 1/5 000 and 1/10 000 sec. A
electronic flash outfit is very expensive, but the cost pe
individual flash is quite negligible. The very short flas
duration allows photographing very fast moving object
indoors without blur

*The FOCAL FLASH CHART is a simple and convenient ready means o
reading off the correct aperture to use for any flash-bulb at any distanc
shutter setting and film speed and also includes synchronization data an
typical flash set-ups*

Continuous Light



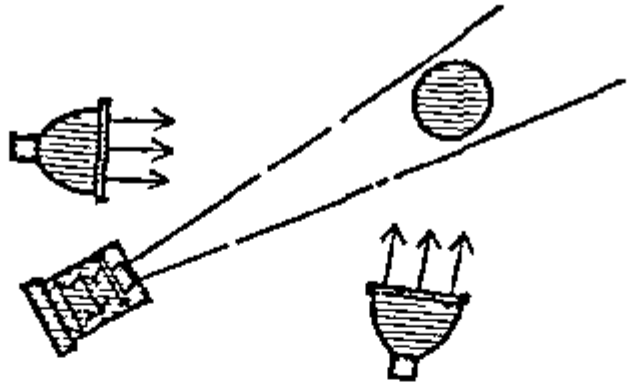
Wherever electric current is available, artificial light can be used for interiors The ordinary room lamp is rather too weak, however, for this purpose, and requires a correspondingly lengthy exposure (See page 119) So we use special lamps which are provided with their own reflector This enables the whole force of the light to be concentrated in a powerful beam which can be directed on to the object to be photographed

This type of bulb does not give such a brilliant light as flash-lamps or powders On the other hand it can be tried out in advance But it is not wise to give way to the temptation of bringing the light close up to the sitter's face for this would result in unpleasantly harsh lighting The source of light should be placed at least five feet from the sitter, and not too much to the side of the camera Otherwise dark shadows will be cast over the field of view In every case a screen to reflect light on to the darker side of the object is strongly recommended (See page 102)

And panchromatic film is essential This is because electric light is especially rich in red and yellow rays

The procedure to be followed differs from that required for flashlight pictures First of all the light is switched on, the ordinary room lighting being retained The shutter opens for the necessary time and closes again Lastly the light is switched off

Two Lamps are Better Than One



Indoor portraits made in the light of one lamp are in reality only half a job One side of the sitter's face is too strongly lit, while the other half lies in the shadow The white screen improves the situation only to some extent

It is far better to replace the screen by a second lamp It should be placed farther away from the model than the first lamp for its purpose is merely to dispel unwanted shadows The other lamp provides the main lighting

The relative positions of the two lamps can be changed *ad infinitum* one can be placed lower than the other , the two lights can be set at any acute angle to each other A different lighting effect will result from every new arrangement

HINTS AND TIPS

Flashlight

It is quite possible to place several flash bulbs in various parts of a large room, all connected together and to release them simultaneously by means of a master switch

Neither snow nor rain nor dampness will stop the prompt action of a flash-bulb, which may be used for all out-door work

Before putting the flash-bulb into the torch, see that it is switched off by testing it with an ordinary bulb Otherwise the flash will occur before you are ready for it

Electric Light

Before using any electrical apparatus, make sure that it is the right voltage for your district It makes no difference whether you are A C or D C, but it does make a difference—and a costly one at that !—if you join 110-volt apparatus to a 250-volt circuit

Orthochromatic emulsion is almost entirely insensitive to red, or even yellow light Used, therefore, with ordinary electric lighting, which contains a high proportion of red and yellow rays, it requires three-fold the exposure of pan material.

Pictures can be made even with the help of an ordinary table-lamp, provided the exposure is long enough to allow the feeble light rays to make an impression on the emulsion And if you replace your 60 watt bulb by a stronger one, say, a 100 or 200 watt lamp, the time can be cut down considerably

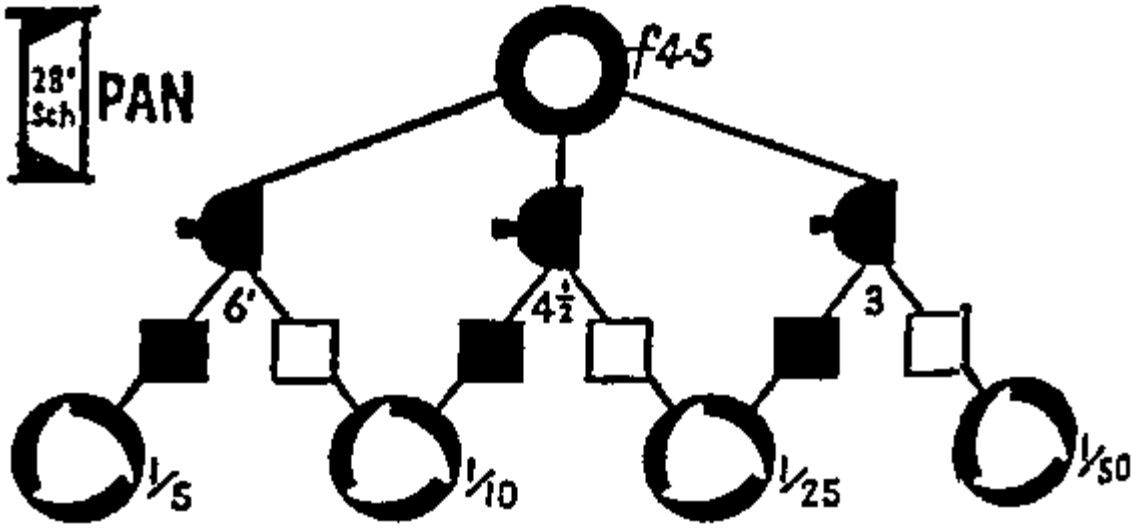
For a really short exposure (1/5 to 1/25 second) a 250 watt photoflood or 500 nitraphot bulb can be substituted, provided the heat is not too much for your lamp-shade People taken by the light of their usual reading lamp feel more at home

An electric exposure meter cannot be relied on to give accurate readings in an ill-lit room A good method of helping matters along is to place a white sheet or screen near the chief subject of the picture a person, for example, and to measure its brightness at a distance of 3 ft The time indicated must be multiplied by ten to get the actual exposure required

For testing, replace your photoflood lamp by an ordinary bulb It saves the lamp and is more pleasant for the sitter

For all photos taken by artificial light the distance between the camera and the object has no effect on the illumination The distance between the light and object matters

A camera fitted with a fast lens at least 2 8, or better, 2 or 1 5, enables you to take " candid " snapshots in ordinary well-lit rooms, restaurants, hotel halls etc By using an ultra fast film an exposure time of 1/4 to 1/25 sec —according to the brightness of the light—should prove sufficient



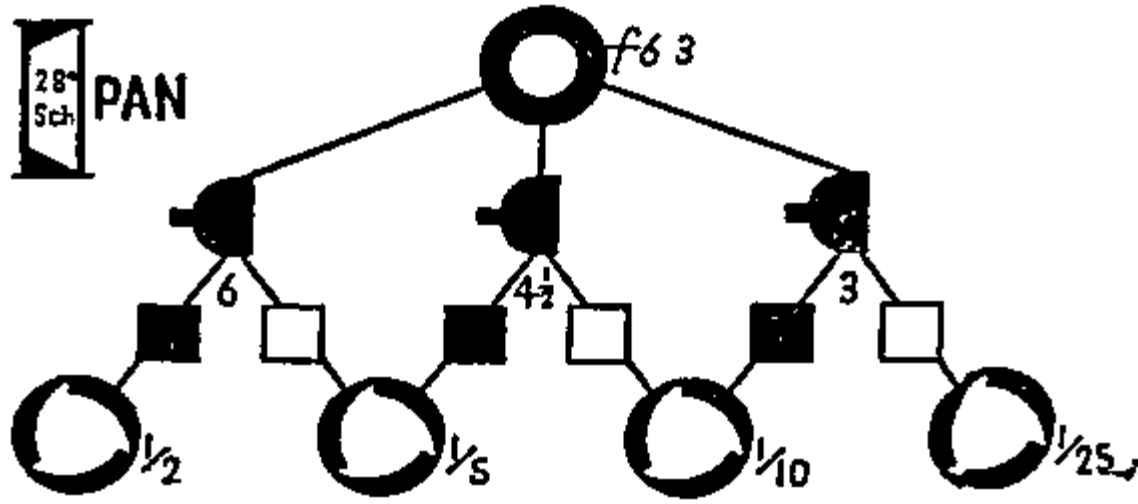
THIS PHOTOFLOOD EXPOSURE FINDER for one Photoflood lamp in reflector assumes the use of panchromatic film of 27–30 degs. Sch The exposure time in the bottom rows will always secure a satisfactory result if you trace the line down through (1) stop (2) distance from lamp to subject (3) tone of subject to (4) exposure time

If orthochromatic film is used double resulting exposure

If pan film of 32s deg Sch is used halve resulting exposure

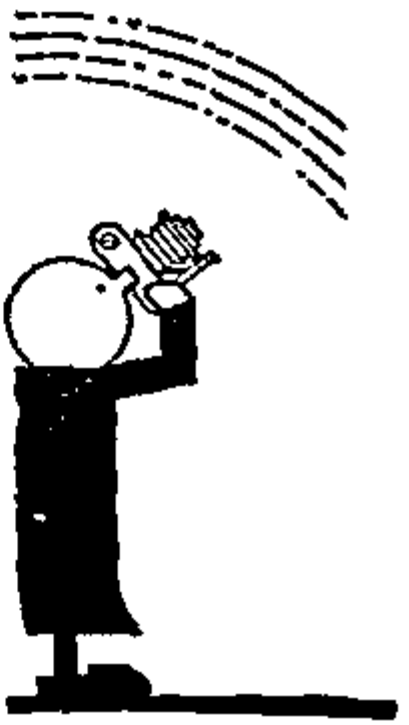
The upper drawing is valid with *f4.5* as standard stop, *the lower* drawing is valid with *f6.3* as standard stop

Example With one Photoflood lamp 4½ feet from a standard subject we need 1/10 sec.—with the lamp 6 feet from a light subject again 1/10 sec. will do (using 20° Sch panchromatic film and stop 4.5) while at stop 6 3 we need 1/5 sec in both cases quoted



AND NOW FOR COLOUR

The Photography of tomorrow with materials which are scarce today



After long years of research and costly experimenting scientists have at last produced a film which reproduces the world around us in its natural colours Its use entails no more knowledge and no more apparatus than was required for ordinary black-and-white photography.

The science of colour is a fascinating study with many branches and a thorough familiarity with it would require a wide knowledge of physiology and psychology, as well as a considerable acquaintance with astronomy, organic chemistry and the structure of the atom

Now it would be a poor look-out for colour photography if its adepts needed to know even a fraction of all these matters But it is fortunately possible to be a radio fan without knowing anything about the complicated process by which the sound travels from the transmitting station, via your receiving set, to your ear In the same way you can make excellent colour photos without knowing much about the theory of colour What follows will at any rate give you enough facts to enable you to talk intelligently about your hobby

There is no need to remember all the seven colours of the rainbow . red, orange, yellow, green, blue, indigo, violet (Richard Of York Gained Battles In Vain) Three will do, namely, red × green × blue. All the myriad colours of nature can be reproduced with the aid of these three tones

In daylight the three types of light rays are inextricably mixed in almost equal proportions And the result of the mixture as far as our eye is concerned is—white.

When a beam of white sunlight—that is, a mixture of red, green and blue rays—falls on the leaves of, say, a sunflower, the blue and red rays are swallowed up Only the green rays are reflected, with the result that the leaf appears to us green But the flower itself absorbs the blue rays and reflects the red and green elements of the sun's light

The mixture of red and green rays produces the sensation which we call "yellow."

Such are the basic principles applied in the process of colour photography in order to capture and reproduce all the hundreds and thousands of shades of natural objects, using only the three primary colours.

The Scope for Colour Photography

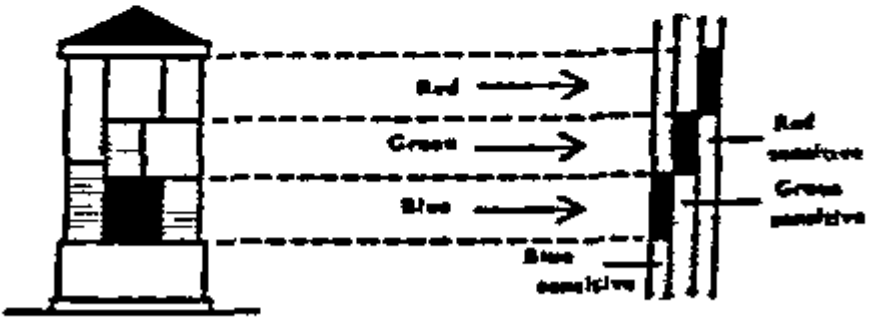
There is no lack of subjects for the amateur colour photographer. Almost anything that can be taken in monochrome can now be snapped in colour. First of all you will naturally choose the people around you, grown-ups as well as children, at work, at play and on the sports ground.

If you have a garden you will need no encouragement to reproduce its beauties in colour. The glorious red of your dahlias and the luminous yellow of the king-cups on the lily pond simply cry out for colour films. And of course you will put a colour film in your camera before you set out on your walks and excursions, for now you can take all your favourite scenery with the additional advantage of having it in its natural colours. Animals make excellent studies for colour photography: the tigers and zebras in the zoo, the cows in the meadows or the frisky young foal in its paddock.

In addition to all this there is a wide field of worth-while photography for people with hobbies of all kinds. One man will want to produce a picture in colours of some particularly fine specimens in his stamp album. The naturalist will make pictures of his butterflies and moths, or catalogue the flora of his district by means of a series of photographs showing the flowers in their natural colours. The microscopist will want coloured pictures of his specimens. And so on in many other domains, in all of which, with the

help of colour films, one can secure original and valuable photographs In this way a hobby may develop into a real achievement, something which, besides amusing the author of the work, makes a contribution to the whole community

Materials



But how does colour film produce a colour picture ?

Most colour films carry three light-sensitive layers Each layer is sensitive to one colour only : the top layer records the blue parts of the image, the middle one the green, and the lowest layer the red It is the combination of these three images which produces the picture in natural colours

There are two types of colour film

The first type is colour negative film and works much like black-and white film . you get a negative, and you have to print it to get a positive picture The films that work in this way are *Agfacolor Negative, Pakolor, Gevacolor Neg -Pos.,* and *Kodacolor* When you hold up these films to the light, you will see the characteristic reversed tones of the negative picture—dark sky, light shadows, black faces, and so on In addition, the colours are all different, too flesh tones are bluish green, the sky is brownish, green grass looks pink On printing this negative on a special colour paper, you get a proper colour picture again

The second type, reversal colour film (e g *Ansco Color, Dufaycolor, Ektachrome, Ilford Colour, Kodachrome*) produces

positive colour transparencies on the film which was exposed in the camera These transparencies can either be viewed against a bright light (e g , in a viewer) or projected on a screen by means of a transparency projector.

We can, incidentally, also produce colour transparencies from colour negatives or colour prints from transparencies In both cases this is a more involved process

Speed

In comparison with black-and-white film, colour films are rather slow and should not be used in cameras with a lens of less than f 6 3 aperture

The table on p 124 gives the film speed both in British Standard Exposure Index numbers (which are equal to the American A S A Index numbers) and Scheiner degrees

Use a reliable photo-electric meter to determine the exposure time when using colour film, as the exposure atitude is rather less than that of black-and white material

The table below is intended as a guide to correct exposure with *Agfacolor Negative*, *Ansco Color*, *Dufaycolor*, *Ektachrome*, *Ilford Colour*, *Pakolor*, *Gevacolor*, and *Kodachrome* film For *Kodacolor* less than half the exposure is required

COLOUR FILM EXPOSURES

Subject		*Bright Direct Sun*	*Hazy Sun*	*Overcast Bright Day*	*In Shade, Bright Day*
Light colours	with the light	1/50 f 8	1/50 , f 6 3	1/50 , f 5 6	1/25 , f 5 6
Dark colours	with the light	1/50 f 6 3	1/25 , f 6 3	1/25 , f 5 6	1/25 , f 4 5
Subjects in side light		1/50 , f 5 6	1/25 f 5 6	—	—
Subjects against the light		1/25 f 5 6	1/25 , f 4 5	—	—

This table is valid for mid March to mid September, from 9 a.m to 3 p m In the winter months use the next larger aperture.

Colour Balance and Contrast

Colour films have been designed to produce brilliant colour transparencies when viewed by projection or when simply looked at against the sky or a lighted lamp So strive for soft lighting when making colour pictures

COLOUR FILM DATA

Film	Type	Sizes	Speed BS. ASA	Speed Sch°	Processed by
Agfacolor Neg	Daylight (T)	35 mm and roll film	12	23	Dealer
Agfacolor Neg	Tungsten (K)	35 mm and roll film	12	23	Dealer
Agfacolor Rev	Daylight (T)	35 mm	12	23	Maker
Agfacolor Rev	Daylight (K)	35 mm.	12	23	Maker
Ansco Color	Daylight	35 mm and roll film	12	23	User or dealer
Ansco Color	Tungsten	35 mm and roll film	12	23	User or dealer
Dufaycolor	Daylight (with filter)	35 mm. and roll film	8	21	User, dealer or maker
Dufaycolor	Photoflood	Cut film	6	20	User, dealer or maker
Ektachrome	Daylight	Roll film and cut film	8	21	User or dealer
Ektachrome	Tungsten (B)	Cut film	8	21	User or dealer
Gevacolor Rev	Daylight	35 mm	12	23	Maker
Gevacolor Rev	Photoflood	35 mm	12	23	Maker
Gevacolor Neg	Dayl ght	35 mm.	12	23	Maker
Ilford Colour	Daylight (D)	35 mm	10	22	Maker only
Ilford Colour	Photoflood (A)	35 mm	10	22	Maker only
Kodacolor	Daylight	Roll film	25	26	Maker only
Kodacolor	Photoflood	Roll film	25	26	Maker only
Kodachrome	Daylight	35 mm and K828	10	22	Maker only
Kodachrome	Photoflood (A)	35 mm and K828	16	24	Maker only
Pakolor Neg	Daylight (D)	35 mm and roll film	12	23	User or maker
Pakolor Neg	Photoflood (A)	35 mm and roll film	12	23	User or maker

One can rely on the maker to provide uniformly good colour balance material If the transparency is off colour, e g , too blue or too red, one can generally assume some error in exposure or possibly in processing technique

The light around us varies considerably from hour to hour and from season to season It would be impracticable for the manufacturers to make all the films needed to suit the many light variations As a result they have selected several representative light sources to which they balance their films The three types of lighting selected were daylight, i e., bright sunlight on a clear day (type D or T films), high efficiency tungsten lamps (type B or K films), and Photoflood lamps (type A films)

Filters in Colour Photography

While filters are generally not required in colour photography if the picture is exposed by the type of light for which the film was balanced (except with Dufaycolor, see below) there is a range of filters for special conditions

Haze filters are used for haze correction in photographing distant landscapes and seascapes and in making pictures at high altitudes The fact that they swallow some blue also makes them useful for minor changes in colour balance

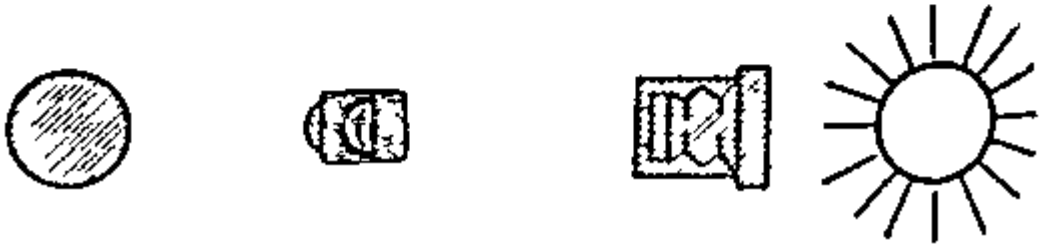
Conversion Filters enable us to expose colour film when the light source used differs considerably from the light source for which the film was made For example, if the exposure is made outdoors with film for artificial light and vice versa

Polarising Filters are used with colour films to reduce reflections from non metallic surfaces and render skies darker They help to produce a more brilliant image by eliminating these surface reflections In colour work the polariser must be of the neutral (colourless) type In general, from 1 to 1½ lens stops increase in exposure is required with a polariser

Dufaycolor is always used with a filter This is supplied in

The advanced amateur may want to make prints from his transparencies by means of dye imbibition from colour separation negatives For this the *Kodak Dye Transfer* or the *Autotype Trichrome* processes are available The colour fidelity and the pleasing results obtainable make these well worth trying But to assure good results, extreme care and a fair amount of skill are necessary.

The Basic Rules



There are rules of the game in colour photography just as there are in ordinary black-and-white work. The picture must, of course, be sharply focused And even if you have a steady hand, it is unwise to risk a longer exposure than 1/25 second without making use of a tripod or other firm support A safer rule for colour snaps made with the camera held in the hands is to give not more than 1/40 or 1/50 second Similarly one must avoid getting a blurred image of moving objects (see page 44) And finally, here, as with monochrome photos, a smaller stop will give greater depth of focus (see page 47)

Unlike the black-and white picture, which depends on differences of light and shade, the colour photo consists of a juxtaposition of different colours Deep shadows look heavy and dead among the lively, gay masses of colour, a fact which explains why shadows should be avoided, at any rate in one's early attempts at colour photography

Objects should be taken with *front lighting*, that is, with

YOU DON T NEED LOTS OF COLOURS Use few colou s n your f rst colour p cture and watch what happens The S amese cat on the red carpet gives a foretaste of it It p oves that a few patches of strong colour can yield a brighter picture than would all the t nts of the rainbow crowded into the same shot —*John Blaxland*

the form of a piece of gelatine with each particular emulsion and is only suitable for that batch On request this filter may be had for daylight (D/1) half watt domestic lamps (D/2), Photoflood (D/3) or flash bulbs (D/4) While the film speed incorporates the filter factor, the filter packet is marked with a code Z, Y, X, or W Z indicates that 1 stop larger than standard exposure should be used. Y means that standard exposure as indicated by meter will be correct with X, 1 stop smaller, and with W, 2 stops smaller than standard exposure is called for

FILTERS FOR COLOUR WORK

HAZE FILTERS

Purpose	*Filter*	*Exposure increase*	*Suitable for*
Light Haze Correction	Wratten 1A	Negligible	Ansco Color Ektachrome Ilford Colour and Kodachrome
	Ilford Q	Negligible	
Moderate Haze Correction	Wratten 2B	Negligible	
Extreme Haze Correction	Ansco UV17	Negligible	

CONVERSION FILTERS

Purpose	*Filter*	*Exposure increase*	*Colour of Filters*
For exposing Ansco Color Tungsten to daylight	Ansco 11	⅓ Stop	Yellowish-orange
For exposing Ilford Colour A to daylight	Ilford 161	⅓ Stop	Yellowish brown
For exposing Kodachrome Type A to daylight	Wratten 85	⅓ Stop	Salmon
For exposing Ektachrome Type B to daylight	Wratten 85B	⅓ Stop	Salmon
For exposing Ansco Color Daylight type to tungsten illumination	Ansco 10	2 Stops	Bluish
For exposing Ilford Colour D to Photofloods	Ilford 351	1⅓ Stops	Mauve
For exposing Kodachrome Daylight type to Photoflood Illumination	Wratten 80	2 Stops	Bluish

Processing of Colour Films

Once the colour film has been exposed, processing is done either by the manufacturer, by a colour dealer, or by the user, depending on the film and one's own preferences.

In the case of *Ilford Colour* and *Kodachrome*, processing is included in the price of the film.

Ektachrome can be processed either by the user or the dealer. It will also be processed by Kodak (only in Gt. Britain).

Agfacolor is processed by Agfa dealers and *Kodacolor* by the makers who develop the film to a colour negative, from which colour prints or enlargements or black-and-white prints can be made.

Ansco Color, *Pakolor* and *Dufaycolor* films will be processed by the manufacturer or by the dealer, or one can process them oneself at home.

Colour *Printing Materials*

Besides viewing and projecting the colour transparency (see p. 140) it is now also possible to get colour prints on paper. A number of colour printing materials of varying degree of practicability are available. There are several printing materials that hold good promise for successful manipulation by the amateur : *Agfacolor* paper, *Ansco Color Printon*, *Pakolor*, the *Kodak Dye Transfer* process and the Autotype *Trichrome Carbro process*.

Printon produces a positive print from the positive colour transparency.

Agfacolor and *Pakolor* papers are positive materials and produce positive prints from colour negatives.

Printon as well as *Pakolor* and *Agfacolor* paper carry three emulsion layers *like the colour films* (p. 122), but are processed differently. Suitable filters are available for each to correct the colour balance of the printing light and of the colour print.

The advanced amateur may want to make prints from his transparencies by means of dye imbibition from colour separation negatives. For this the *Kodak Dye Transfer* or the *Autotype Trichrome* processes are available The colour fidelity and the pleasing results obtainable make these well worth trying. But to assure good results, extreme care and a fair amount of skill are necessary.

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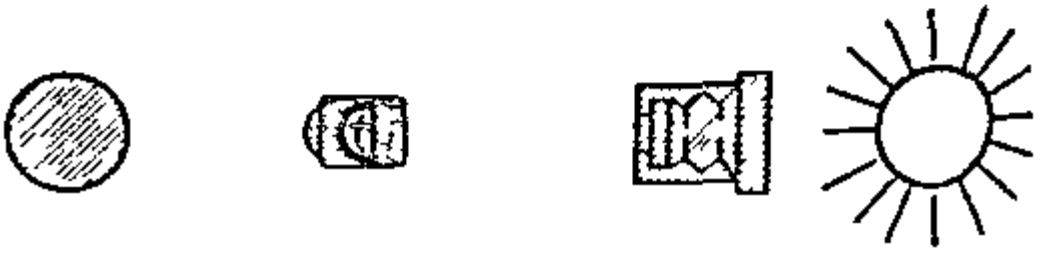

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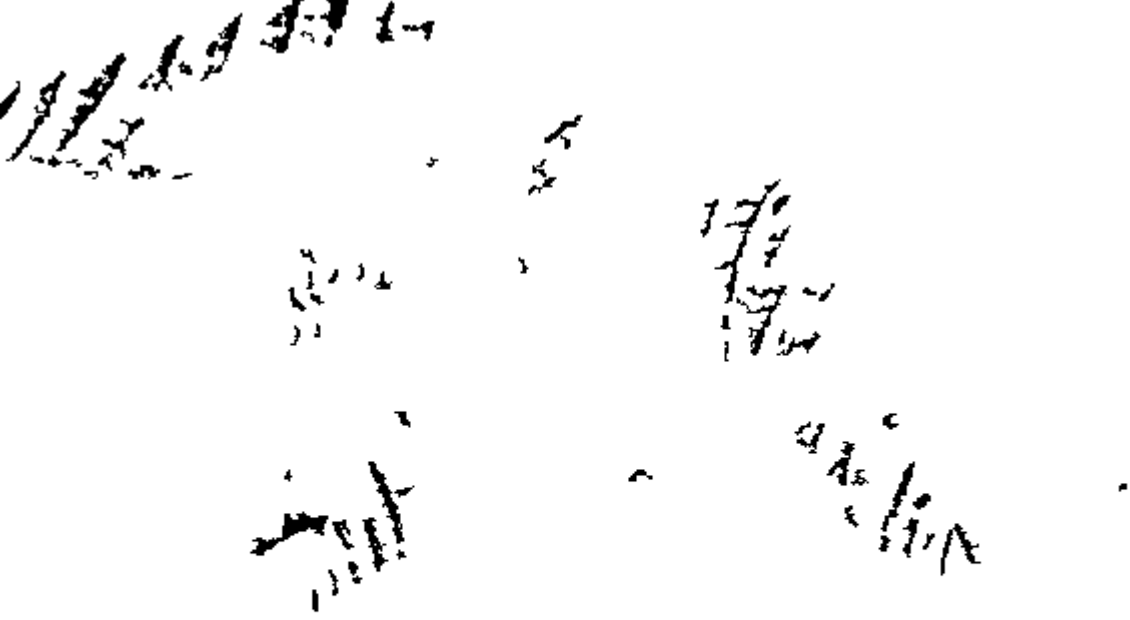
Objects should be taken with *front lighting*, that is, with

COLOURS DEPEND ON EACH OTHER The colours of this baby seem bright enough because ts clothes have nat much colour of the r own It is best not to have strong colours around portra ts unless they are contrasting ones as the pale blue p llow n th s case —*G T Deem ng*

THE COLOURS NEED NOT CLUTTER UP THE WHOLE PICTURE
Most of th s one shows a g ey sea The pony plays a b g part in it but the pony s black and wh te So the bit of colour the l ttle g l wears gets a chance to draw the eye —*R H H l*

WE HAVE MANY COLOURS th s t me Many greens all sorts of browns some red and the blue of the sky on top of it all Still the p cture s sat sfactory Why ? Probably because none of the colours d owns the others People n the know would call that a well balanced compos t on But nobody can reliably tell you how to balance your own shots So t is safer at the beg nn ng to steer clear of such tasks —*T E Bass ndale*

reds and pinks The girl on the left is tan and pink all over The portrait on the right is red and yellow throughout Blends of yellows and greens or blues and violets work equally well — *Edwin Broomer G Denes, W Ellison*



A WHOLE BATCH OF BRIGHT CONTRASTING COLOURS will not easily blend Two more or less complementary colours are suff cient to create colour contrast The rest of the picture depends on the hues and gradation of tone within each colour —*H I Williams*

the sun behind the camera, a lighting arrangement which, on account of the flat, uninteresting light and shade effect it produces, is most unsuitable for black-and-white pictures, but which gives excellent results with colour films

Colour films have very little latitude This point is all the more important because black-and-white films have spoiled us in this respect Accurate exposure is of the very greatest importance

If, for example, the correct aperture for any given exposure is *f* 8, the next larger stop (that is, 5 6) would, the other conditions remaining constant, produce definite over-exposure, whereas an aperture of *f* 11 would naturally be too small and would result in considerable under-exposure

Wrong exposure of colour films results in distortion of colour values Over-exposure produces wishy-washy colours, pale faces, a watery sky and greeny-blue shadows Under-exposure gives hard, deep colours, dark brown faces and a deep blue sky.

The exposure of colour films being such a ticklish business, you will be well advised to use a reliable electric exposure meter. The needle will give you trustworthy information from the very beginning, even if you have never used the meter for this purpose before But the following tips, which are the fruit of experience, must be borne in mind

For close-ups the exposure meter should be held halfway between the camera and the object This is to prevent the dial reading from being influenced by the surroundings

For distant views, landscapes, for example, the exposure reading is usually taken at the point from which the photo is to be taken, the meter being pointed downwards somewhat in order to exclude some of the bright light from the sky

The reading on the dial of the exposure meter is valid for objects of medium brilliance, in which light and dark colours are to some extent balanced

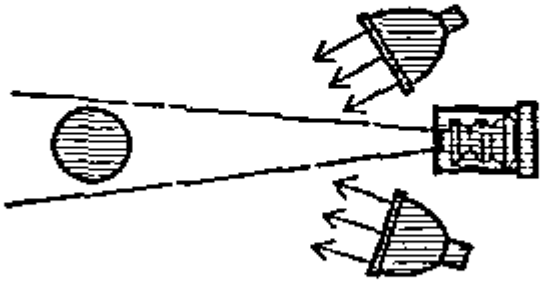
For dark objects such as trees in summer and autumn flower beds in which green predominates people in dark clothes and for dark colours in general—dark green violet dark blue dark red black—the exposure should be doubled or the aperture increased to the next larger stop

For light objects such as open landscapes large squares or wide streets, people in light clothes for scenes on the beach in the swimming pool for snow scenes and for all light colours—white yellow light pink orange light green light blue—an aperture half a size smaller than the one shown by the meter can be used

People who perforce must do without an exposure meter must rely on the experience they have gained with black and white films As for the exposure tables included in the instructions which accompany every film they must be considered as providing a useful starting point but not as giving exact information

A further and most important rule for colour snaps is the following make full use of all the available space on your film The colours themselves will be more vigorous and more convincing if the snapshot is from close quarters

Colour Photos by Artificial Light



In comparison with daylight artificial lighting has the advantage of being easier to control Whereas daylight varies with every hour every season and every change in the weather artificial light gives one a constant illumination

It may happen that a colour snap by artificial light shows signs of under-exposure If so, the picture can be made again under improved conditions In this way experience will soon be gained to make failures few and far between

Snaps made by artificial light require an emulsion specially manufactured to suit the colour components of this kind of lighting (See page 124)

Ordinary household bulbs, on account of their relatively low power of illumination, necessitate rather lengthy exposures for colour photography and the resulting pictures have warm, and sometimes even reddish, tones Photographic lamps are more suitable Used in conjunction with one of the special emulsions for artificial light, they ensure accurate colour reproduction

Moreover, for artificial light, the three rules already given for daylight pictures still hold good · use front lighting give the correct exposure and make your picture as large as possible

When only one source of light is used the flat, shadowless illumination which is essential for good colour effects is best ovtained by producing the flash near to the camera If two lamps are used—and this arrangement is the one that gives the best results—they should be placed on either side of the camera and at equal distances from the object, which is thereby lit as uniformly as possible

The length of exposure depends in the first place on the brightness of the source of light Exact indications are contained in the instructions which accompany the colour film These can be considered as entirely reliable

Flash pictures in colour are as easy to take as black and-white but you need special bulbs If you have daylight type film in your camera, you need blue tinted bulbs, e g , Philips, where the number ends with /97, e g , PF 25/97 , or Mazda or G E C bulbs ending with the letter B, e g , No 22B For artificial light film use yellow tinted flash-bulbs ending with the numbers /98, e g , PF 60/98

Displaying the Picture

With reversal colour film you will only get one copy of each picture—or rather, you get the original Moreover, this is a transparency, a coloured lantern slide Paper prints can be made from this transparency (see page 127) but it is primarily intended to be viewed by transmitted light.

On the other hand, colour transparencies can be produced from colour negatives for viewing or projection

There is a whole series of " gadgets " for viewing colour films in comfort For, except for the large size films the 1 × 1½" (24 × 36 mm) pictures made by a miniature camera are altogether too small to be seen comfortably

A simple and inexpensive piece of apparatus for viewing colours films by daylight consists of a magnifying glass set in a frame into which the pictures can be inserted If the holder is then held up against a light background the picture appears large and well lit There is a ground glass screen to diffuse the light and ensure uniform illumination

Even handier is the viewer designed for use with artificial light Here the ground glass screen is lit by an electric lamp This type of illumination, being soft and yet powerful, and employing a suitable combination of light rays provides excellent colour reproduction

The colour quality of the light by which you view your trans parencies and prints has a marked effect on the appearance of your photographs It is therefore important that, to make fair comparisons, both the transparencies and the prints are viewed in the same light The colours in the prints won t look quite as vivid as those in the transparencies

Undoubtedly the finest method of viewing colour films is by using a projector which throws on to the screen a really large picture in which every detail can be admired by several people at the same time

Some Good Advice on Taking Colour Snaps

Keep to one make of film long enough to become familiar with its peculiarities and with its special requirements with regard to exposure In this way you will get the best out of whatever material you may use

Colour snaps should, of course, be coloured, but they need not look like a patch-work quilt There is no necessity to include all the colours of the rainbow in your picture You will get a much better effect with a few large patches of well assorted colours—yellow and blue, for example, or green and red Close-ups serve almost automatically to limit the picture to one or two large surfaces, each of one colour only

In choosing suitable subjects for colour photographs, an important psychological fact should be taken into consideration This is, that most people are apt to notice many more colours in a picture than they do when looking at their surroundings In everyday life nearly all of us—with the exception of painters—content ourselves with a superficial perception of local colours, whereas when looking at a colour picture we notice secondary shades, coloured reflections, coloured shadows and so on, and in consequence even a picture which faithfully reproduces natural colours is likely to be considered too variegated Although it is probable that we shall eventually become familiar with the richness of natural colours as rendered in the photographs, it is advisable to avoid subjects which are over-full of strongly coloured shades and reflections

A deep blue summer sky needs careful handling The real thing, of course, is enchanting Even so, without clouds it is apt to look a bit gaudy If there are dark-coloured objects in the foreground, the danger is already less because the exposure is taken from these This means that the sky will be somewhat over-exposed and will appear a little paler, which is all to the good

From colour negative film you can get black-and white prints even more simply by printing or enlarging in the same way as from black-and white negatives

Although technically every colour photograph can be transformed into black and white, it must be borne in mind that a good colour picture will not necessarily result in an equally good black and white one In fact, while the beauty and the expressiveness of a colour photograph depend on colour combinations and harmonies, the black and white picture relies only on the relations between black white and the different shades of grey

Two points should be remembered The black and white negative from a colour film is inclined to be hard One uses, therefore, soft material and makes the development as soft as possible *(See formula on page 225)* *In the second place since colour film is reversed, the negative is a mirror image of the real object In order to correct this do not, as some cunning fellows might, place the emulsion layer of the pan film against the celluloid side of the colour film This would only produce a blurred image, since it has been printed through the thickness of the celluloid You can, on the other hand, put the reversed negative into the enlarger with the emulsion side turned towards the lamp and so produce an enlargement the right way round*

PHOTO-SUBJECTS A—Z

How your photography should be adapted to whatever you want to photograph

Green is an awkward colour If it comes out too dark it looks like spinach Slight over-exposure immediately produces a virulent hue The eye is much more critical of distortion in green than in the other colours, red and orange, for example, or even blue

In the case of reflections the photographer should remember that a green shadow on a face will give an extremely strange effect when the tree which causes it is not shown in the picture This is also true for red reflections, such as may be caused by a fire or a red coat, whether or not the object throwing the reflection is included in the picture

Snow scenes in colour sometimes show definitely blue shadows This may at first offend one's vision But a little experience with snow in the same conditions, that is, beneath a blue sky will prove that the colour film was right The shadows, thanks to the reflection of the sky, are blue

Portraits are a very interesting but rather tricky task for the colour photographer Deep shadows under chin and nose and in the eye-sockets should be avoided by a carefully levelled lighting, which in the case of artificial light should rely on not less than three photolamps and some reflectors But if the photograph consists only of head and shoulders, two, or even one, photolamps may be sufficient Be sure the reflectors are colourless, also don t place anything coloured over the lamps to achieve soft lighting effects

Although front lighting, i e , with light behind the camera is the rule a lens hood will be found useful for excluding unwanted light from the sides, reflections from white walls, water, and so on It likewise protects the lens from disturbing light from a cloudless blue sky above and from the bright reflections from the road surface below The result is a clearer reproduction of colours

The rules for taking colour photos of firework displays and thunderstorms are the same as for black-and white pictures Shutter release at T , shutter open, stop 2.8 or 3.5, focus at infinity The shutter is closed when the photographer considers

that the film has accumulated a sufficient store of light impressions

For photographs by night of advertisement signs, etc, an artificial light film should be used

The old trick of using an ordinary electric lamp for lightening the shadows of an object near the window will not work with colour film in the camera if artificial light material is used The side of the object which is lit by the electric bulb appears reddish on the picture If, on the other hand, you use an artificial light colour film the colours on the daylight side of the picture are not true to life

Once they have been exposed, colour films should not be left undeveloped too long Otherwise the colour reproduction may suffer So once a film has been started, finish it off quickly, and when the whole film is exposed, do not leave it lying about for longer than you need

In all cases where colour films are not sent back from the photographic firm already cut and mounted, it cannot be too strongly emphasised that they must be divided into individual pictures immediately on receipt even before examining them Each individual film should be framed between two cover glasses and surrounded by a mask Only then are they in a fit state to be handled and admired This is the only way to prevent damage from dust and dirt, finger marks, scratches and so on

Colour films and prints should not be exposed for long to bright sunshine or the colours may fade

Black and White Prints from Colour Films

It is possible to get black and white prints and enlargements from colour films All you have to do is to make a contact print on panchromatic material This print appears as a black and white negative, which can be copied and enlarged like any other negative

ANIMALS.—*Our Pets*—We only need to watch them at play or in repose to get not one, but a whole series of pictures. The camera is best pre-set for zone focusing (p 46) A low viewpoint is essential, otherwise we shall dwarf our subject *To get close-up heads* it is best to pre-set the camera at a fixed distance, attract the attention of the animal and expose just as the head comes into range *In the Zoo* animals behind bars and coarse mesh netting can be photographed by putting the lens right into the space between the bars or netting to avoid their appearance in the picture With fine meshed netting we may also push the lens against the netting, which will then be so far out of focus that it fades out of the photograph. The chief problem will be the usually distracting and ugly background By choosing side lighting we can eliminate background detail At the same time the animal will receive satisfactory modelling and will "stand out" boldly One should make sure of generous exposure to secure good rendering of fur, skin or feathers. Orthochromatic material without a filter will serve in most cases Subjects with a very wide range of colours are better taken on panchromatic film and with a medium yellow filter

Good Photo Guides on this subject are, "Dogs and Puppies" and "Cats and Kittens" by Philip Johnson

ARCHITECTURE.—The typical "picture-postcard" view can be bought but not the small architectural discovery So concentrate on detail Any normal camera will cope with such tasks The camera has to be held straight, otherwise everything will appear distorted and toppling over (Still, *intentionally* distorted views may be effective For these you must go quite close to the building and take it at a sharp angle from a low viewpoint You will have to stop well down to about *f* 16 to make sure of adequate depth of field) If you must get a lot into the picture it is essential to stand well back from the building otherwise a special 'wide-angle lens has to be used to cover a wide field at a short distance. A 'tele-lens" also has its uses for architectural work enabling you to get distant details large in your picture With all architecture direct front light is bound to give a flat, uninteresting photograph with little detail Front side lighting is almost essential to liven up the subject Extreme side lighting may produce disturbingly strong shadows casting across important lines and shapes The exposure time should be determined—particularly if large patches of shadow are included—by the darkest part in which details are clearly visible

Good Photo Guides on this subject are "All About Architecture," by R M. Fanstone, and "Pictures in Town" by Hugo von Wadenoyen

CHILDREN.—Children are the most rewarding of all photographic subjects if we succeed in taking them as they are—unconscious of the camera We must take them when they do what they like and they should never be asked to pose, to look into the camera or be dressed up for the occasion It is best to prepare the camera without being seen, setting the lens at a suitable zone-focus combination (see page 46) Then watch until you are sure that the camera does not attract attention and shoot quickly If a comparatively long shutter-speed is required to

get a wide zone in focus, that need not worry you unduly, as slightly blurred outlines due to sudden movement will not show unpleasantly but will make the picture if anything more alive Never look down on children with your camera but keep to a normal angle with the camera at a height of the child's head or, better still, take them from a low angle, say the height of your knees; the impression will be more natural and pleasing As far as lighting, film, filter and general technique are concerned, what is said on pages 152 and 185 applies here too.

Good Photo Guides on this subject are, "Children Outdoors," and "Children Indoors," by Hugo van Wadenoyen, "Mother and Child," by T. P. H Miller, and "Taking Baby," by W Suschitzky.

FIREWORKS.—The camera is supported by a tripod, the lens directed in such a way as to avoid moving sources of light (like motor-cars), the shutter set to "B" and preferably worked with the cable release Use pan film, set the aperture to *f* 9 and then all you have to do is to press the release while a rocket, for instance goes up, and to close the shutter again Open the shutter once more when the next firework goes up, and so on In this way half a dozen or more single units can be collected on one negative to produce an impressive picture

A good Photo Guide on this subject and other night pictures is "Night Photography" by Frederick Purves A good book on this subject and similar tricks is, "All the Photo Tricks," by Edwin Smith

FLOWERS, PLANTS.—For close-up studies, the roll film camera will have to be equipped with a close-up lens (full particulars on page 15) A tripod or tabletop stand with a ball and socket head is indispensable The panchromatic film of normal speed (27–29° Sch) is the most suitable material, and there are few flower subjects whose delicate tone rendering cannot be improved by the use of a light or medium yellow filter. Flowers and plants should be photographed where they grow, but they need to be isolated from the surroundings This can be done by choosing a suitable view point for the camera and by clearing the ground near the subject Bore fore- and background should be watched, for if blurred parts of other plants are included in the picture they will spoil the effect A sheet of not too white paper fixed to two sticks may be used to form a neutral, restful background, set in a slight curve around the flower it will serve, at the same time, to shield the plant from the wind The hard midday sun will be found unsuitable, and diffused, hazy sunlight as a rule most effective A hand mirror reflecting light to the shadows may sometimes be useful The exposure time should be kept as short as possible to avoid blurring from the movement of the plant in wind The filter should be chosen according to the effect required (consult tables on pages 72–73)

A good Photo Guide on this subject is, "All About Photos in the Garden," by R. M Fanstone.

GROUPS.—While the technicalities of photographing groups are not different from those involved in taking portraits (see pages 152, 185), the pictorial side is a problem which needs study if the group is

not to look like the all too-famous football eleven Some sort of occupation serves to join a number of people together in the garden *around the tea table at sports If nothing of the kind can be arranged* then group them roughly together let them talk to each other but do not let them look into the camera—deceive them as to the moment of exposure even pretend that you have taken the picture and actually expose when they feel free again To avoid over-cutting when taking a large number of people you should use a higher view point a chair a table or a first floor window for example but do not make it too high otherwise you will dwarf the figures too much

Good books dealing with this subject are Photographing People by H van Wadenoyen and Group Photography as well as the Photo Guide Parties and Groups by Gordon Catling

INTERIORS.—With the ordinary camera you will have to content yourself with small sections However if your camera is one in which the lens is interchangeable you can obtain the widest possible angle of *view by fitting a lens with the shortest focal length available The first* essential for indoor work is a solid tripod as the exposure time is bound to be long—as a rule a few seconds If a mere record of the building is all that is required the camera should be placed centrally for a pictorial effect it should be in or near a corner In public buildings *churches etc where artificial light cannot be arranged one will some*times get striking pictorial patterns by making use of sunshine streaming through windows though there is a danger here of producing a patchy effect A safer medium however is soft diffused outdoor light which will bring out details more clearly without too many *heavy shadows The strong midday light should be avoided It is* essential to stop well down—*f* 16 or smaller to obtain sharp reproduction of the largest possible area. Where the light can be arranged as for example at home one can combine daylight with artificial light using the artificial light to lighten deep shadows or work in artificial light *only (See also pages 101 and 104) A simple way to get an even shadow* less illumination with one lamp only is to hold the lamp in the hand and swing it slowly in large circles on either side of the camera towards the part of the room to be photographed without letting the light shine directly into the lens

Two good Photo Guides on this subject are All About Architecture by R M Fanstone and All About Daylight Indoors by H van Wadenoyen

LANDSCAPES.—Distant landscapes rich in small details will usually be disappointing as will those consisting mainly of green values e g meadows with woods in the background By including a subject of known size such as a tree in the foreground we get a measure of distance in the picture and create an impression of depth By choosing a high viewpoint we may be able to disentangle an otherwise confused view A low viewpoint on the other hand will increase the importance of things near the camera. The skyline too may be raised and lowered *according to whether a low or high position is chosen for the camera* Even tilting up or downwards is permissible so long as you keep the camera otherwise level and there are no buildings included in the view

to give you away Tilting upwards will emphasise foreground and diminish background a downward tilt will give you more of a bird s eye view *The mood or atmosphere of a landscape depends to a great* extent on two factors—sky and distance To obtain the impression given by objects which gradually fade into the distance of contrasting colours and cloud formations we must use good quality orthochromatic f lm or better still medium fast panchromatic f lm with its potential ities for well balanced colour rendering But even this highly-suitable material requires further correction in colour balance if it is to bring out the clouds against a blue sky *This is the task for a light yellow filter* A deeper coloured f lter will give a dramatic emphasis to clouds possibly with some loss of atmospheric perspective To d fferentiate between the various shades of green in a landscape a green f lter is preferable to a yellow one A deep yellow or orange f lter will give an even more strik ing effect of dark sky with brilliantly lit clouds green will be darkened and sunlight strongly emphasised Front lighting which is bound to give a flat f eless impression is to be avoided *The interplay of light* and shade resulting from side-lighting will give the picture body and life Back lighting that is, with the camera directed against the light may produce striking effects emphasising outlines and suppressing details but it requires the use of the lens hood to prevent direct sun light from falling on the lens and the exposure time will have to be generous

Good Photo Guides on this subject are All About Landscapes and All About Against the-Sun Effects by H van Wadenoyen

MOONLIGHT—Pictures by moonlight may be taken just as in aylight but as the available light is weak the exposure time has to be onsiderably lengthened In fact to get well exposed moonlight pictures ne must give one hundred thousand times the exposure one would ive to the same picture in direct sunlight *This means that a landscape* n bright moonl ght without deep foreground would probably have to e exposed for 10 minutes at *f* 5 6 to get the real moonlight effect Avoid including the moon itself in the picture as its movement would e reproduced in the shape of distortion *Faked moonl ght pictures* an be taken in sunlight by giving a very short exposure time the egative will then have to be printed so dark that only the highlights ppear while the rest will be black *To get convincing effects the hour* of sunset should be chosen and a sky with clouds the sun itself may be included in the picture to appear as moon

A good book on such tricks is All the Photo Tricks by Edwin Smith while the Photo Guide N ght Photography by Frederick Purves also gives many useful hints

MOUNTAINS—With the normal lens Impressive distant peaks will appear miserably small taking the same subject with a tele lens magnifying two to three times foreground and background will stand out in something like their true proportions On the other hand when moving among or upon the mountains the comparatively wide angle of the normal lens will come in useful to produce a survey particularly

when care is taken to include sufficient foreground to create the impression of depth. It is always possible subsequently to enlarge part of the negative only in order to get a more concentrated effect. Panchromatic material should always be used with a yellow filter at heights up to about 6 000 ft Above this level the ultra violet filter is used to eliminate the ultra-violet rays, which otherwise would " clog-up " the distance and make it appear very hazy Medium and dark filters should not be used at these heights as otherwise the distant prospect becomes too hard and the impression of ' space " gets lost In particular, in photographs of glaciers the sky becomes too dark The values given by your meter remain correct if you use a U V. filter, for which no allowance is necessary At lower altitudes approximately 6 000 ft., a yellow-green filter is sufficient for rendering of sky contrast and atmospheric haze, as long as no prominent foreground is included The orange filter is preferable to obtain special distance effects, to eliminate haze and to bring out the background clearly.

A good book on this subject is, " Mountain Photography," as well as the Photo Guide " Pictures in the Hills," by C Douglas Milner

NATURE PHOTOGRAPHY.—*To photograph birds* the best place and time is at the nest and early in the morning or before 3 o clock in the afternoon To illustrate the technique with an example, we will assume that we are after a song bird whose nest we have found in a bush First the camera position for the best lighting has to be determined, taking into account the change of light during the time you are hiding Tie back branches which would obstruct your view fix up your tripod with the camera, and then focus, making sure that the nest is in the lower part of the picture The distance of the camera from the nest is determined by the focal length of the lens If you work with a normal focal length lens you may have to go as close as 5 feet It is, of course, better to work with a long focus lens which will enable you to keep farther away from the nest and still get a close-up view Now both camera and you yourself will have to disappear from the bird s keen eyes behind an efficient and camouflaged screen Finally, you will have to show your patience by waiting to get your photographs until the bird arrives. Some birds, such as buzzards, kites, crows may be attracted by bait. Good sites are small pools in woods where birds bathe, and the sea shore and mud flats at low tide Most of the successful work is done from hides, which have to vary according to the surroundings. When no hide can be used, a remote control release or a piece of string attached to the shutter release, may prove helpful As material for bird photographs the normal speed, orthochromatic material or pan film is best High speed pan film is required for fast exposure times which will enable you at the same time to stop down to get sufficient depth of focus. *To get birds in flight* is largely a matter of luck and persistence The larger birds with slow wing beat are easier to get than small ones. As the movement even then is relatively fast and the working distance mostly a short one, the shortest possible exposure time should be employed 1/300 to 1/500 sec. will suffice If one is not too close and the camera is d rected along the line of flight

A good hunting ground is the sea shore where sea birds can be attracted by bait Fastest negative material and bright weather are required for good results. The eye-level frame finders or sport finders are the only ones with which one can successfully keep track of the motion Mammels such as otter badger fox polecat, stoat weasel squirrel mouse water vole hare rabbit deer etc., have a strong sense of smell and are shy Their habits should be studied to find out the best position for the camera As many mammals rest during the day the early morning and evening hours are the most likely times to catch them All photography should be done up-wind If bait is used any kind of flesh will attract the fox honey the badger and fresh fish the otter The use of telephoto lenses is a great help in getting a sufficiently close view as the working distance will not often be less than 15 feet The exposure time for mammals in normal movement (if not chased) varies between 1/50 to 1/500 sec. at a distance of 15 feet with movement across the lens Fast panchromatic material therefore is essential particularly as most exposures will have to be taken in the early or late hours of the day

Two good books on this subject are Nature and Camera and Nature and My Cine Camera both by Oliver G Pike

NIGHT PHOTOGRAPHY—The average camera must be mounted on a tripod a small aperture (*f* 16) used In such conditions a medium fast (29° Sch) film will require an exposure time of 5 to 15 minutes according to the illumination available The small aperture with its relatively long exposure time will not record an occasional passer by at all Should however the strong light of a car or bus approach the field of view the shutter will have to be closed until it has passed The total exposure time may thus be made up of a number of partial exposures. The use of a lens hood is essential to ward off stray light from the lens Floodlit buildings lighted shop windows illuminated advertisements brilliantly lit shopping centres can be taken with relatively short exposure times of about 1/2 sec. on the fastest panchromatic film even with modest lens apertures of *f* 4.5 and *f* 6 3 The man with the fast lens *f* 2 to *f* 3.5 will be able without the use of a tripod to get action shots at night of people looking in windows of slow traffic in main streets and similar subjects with fastest pan film and exposure times of 1/10 to 1/50 second

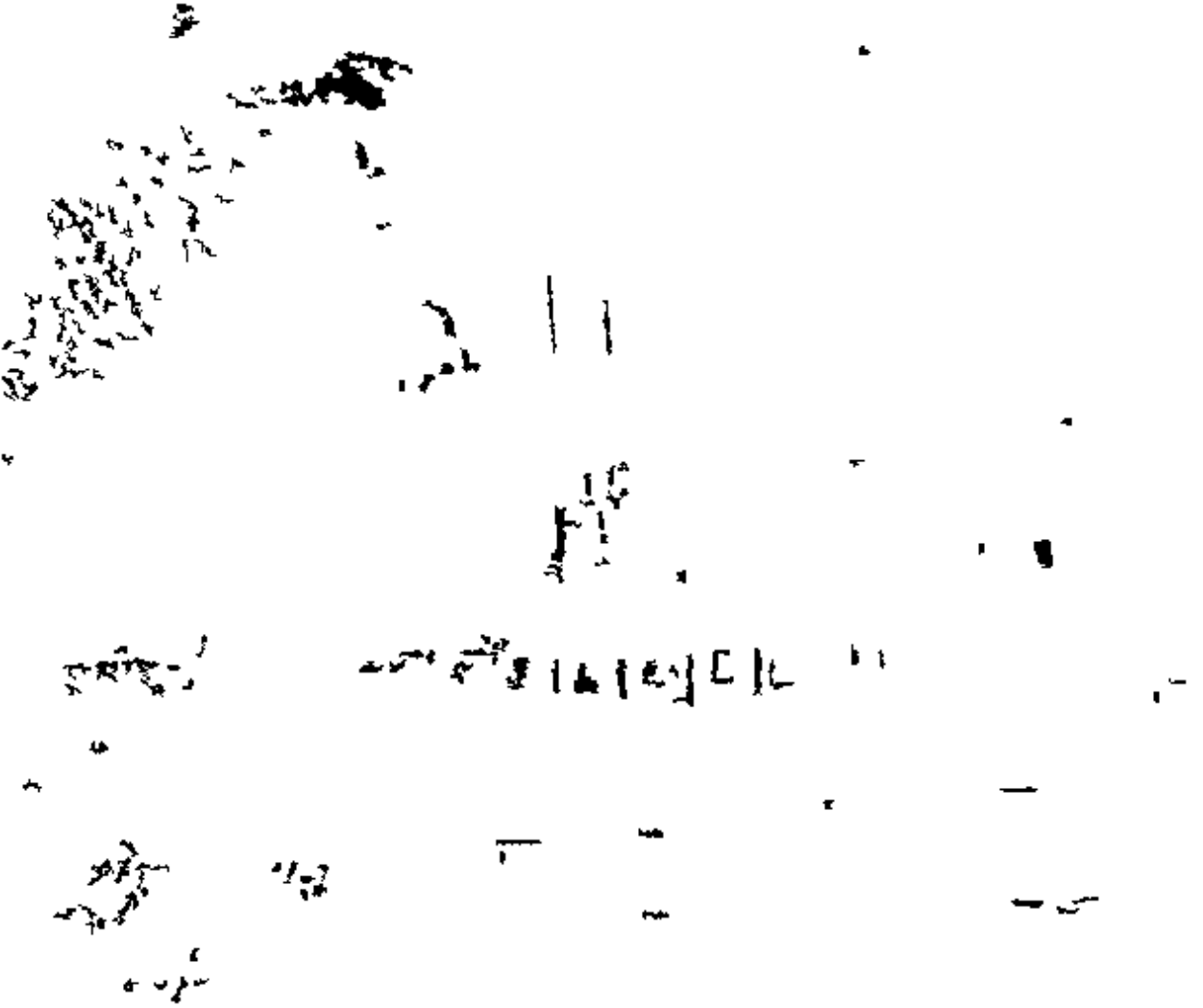
A good Photo Guide on this subject is Night Photography by Frederick Purves A good book with much information on this subject is also My Way with the Miniature by Lancelot Vining

PANORAMAS—A panorama view can be obtained by taking a number of photographs which slightly overlap each other These photographs are joined together to form one picture after the overlap has been cut off The camera should be used on a tripod with a panoramic head The panoramic head allows the camera to be turned smoothly a degree-scale indicating the angle through which the camera has been turned Normal cameras require when used horizontally about 10 pictures for a full 360° Panorama, or in a vertical position about

13 pictures. It is essential that the camera should stand strictly level otherwise the horizon line cannot be linked up

The books 35 mm Photo Technique and Twin-Lens Companion by H S Newcombe as well as The Rollei Way by L. A. Mannheim have a special chapter on this subject.

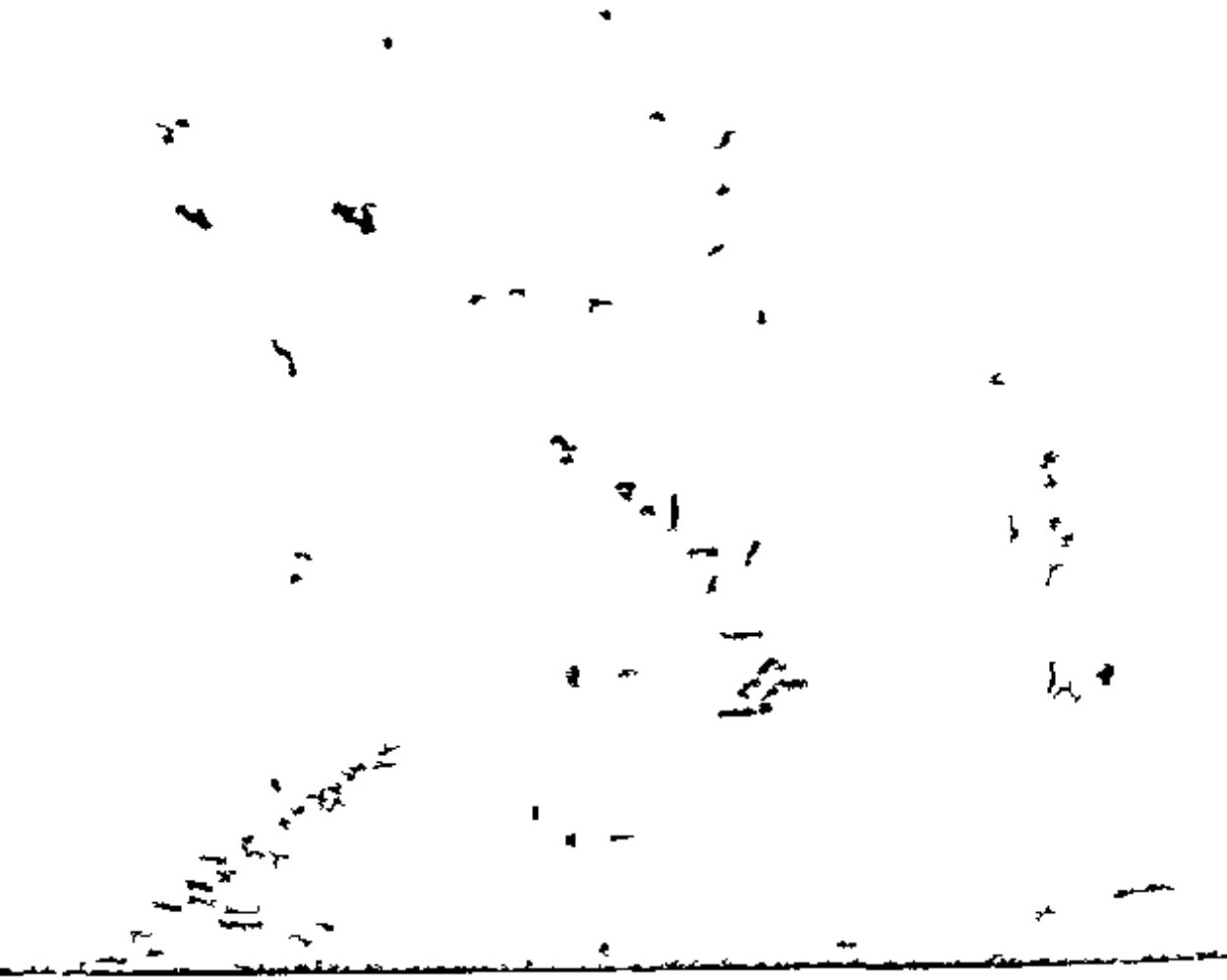
PORTRAITS.—First and foremost get away from the fear of approaching close to your subject. The photograph which is half landscape with a figure placed half heartedly somewhere in it is not a portrait With the average camera about 4 ft. is the most useful portrait distance which will avoid distortion and still produce a large portrait If your camera allows for a change of lenses and you can use a *long-focus lens with twice this working distance it is even better* Next, keep in mind that your finder—reasonably accurate for medium and far distances—will show actually more than you will get on your negative, therefore keep every portion which must be included away from the very margin of the finder The background deserves special consideration *The less prominent it is the better it should be kept strictly* neutral a self-coloured wall or a sky being excellent The most important point in producing the lifelike portrait is the approach to the subject You will not get a good portrait by asking for a smile you will only make the sitter self-conscious and that is the one thing to avoid *Prevent your model from thinking about being photographed by giving* him something to do—let him read smoke play or work—and then watch for your opportunity to snap *Outdoors* the perfect light for outdoor portraits is hazy sunlight strong enough to give good modelling to the face and soft enough to avoid hard shadows Failing this the *shadow of a building* etc *will give good results In strong midday sun* it is just as well to give your camera a rest Morning and late afternoon sunlight will be helpful particularly when the sun shines from the side and slightly in front of your subject The possibilities of a reflector in the form of a large sheet of white cardboard to lighten deeper shadows are worth *keeping in mind Wide apertures should be employed to get* little depth of focus to render the background less prominent While both orthochromatic and panchromatic film may be used for outdoor portraiture the latter is preferable A filter is hardly necessary although a yellow glass is important to get a good sky background with *clouds Indoors with fast films it is possible to take pictures indoors* with any normal camera as long as one works in reasonably good light and not far from the window While practically all that was said about outdoor portraits is also applicable to indoor conditions one should take into account the fact that if the light is coming from one window *only it will cast heavy shadows These heavy shadows have to be lightened* to produce a reasonably balanced negative This can best be effected by a reflector consisting of a large sheet of white paper or any other white material for example a bed sheet a pillow case and so on There are two ways in which even with a slow lens you can keep the *exposure time reasonably short The sitter may either be placed to* one side of the window with a reflector to lighten the shadows, while the camera is pointed towards him from the other side of the window



ARCHITECTURE AND SCULPTURE are best taken in side light for body-effect Level the camera carefully to avoid tumbling verticals Small stops are needed to yield good definition in depth Foliage sky and water will provide pleasant contrast for livening up the picture—but they call for a filter if we want them recorded in good tones Introduction of human element is seldom too successful —Photographs *by L and M Goyton* (page 153) *W Knoll* (page 154) *H van Wadenoyen* (page 155)

LANDSCAPE PHOTOGRAPHY has as many var et es as there are var e ties of landscapes H gh viewpo nts will yield broad v stas low view points are best to br ng out some deta l The wider you cast your v ew the more you will need something in the foreground to give an impress on of depth The d stance seldom need be sharp but stop down sufficiently to ensure sharpness for foreground and centre The ma n point of

interest should be well lit cloud shadows on the rest will make the *most important subject stand out better* *Side light will bring out* modelling For tone and clouds in the sky you need a filter —Photographs by *L and M Gayton* (page 156) *John Erith* (page 157) *H van Wadenoyen* (page 158) *H Gorny* (page 159)

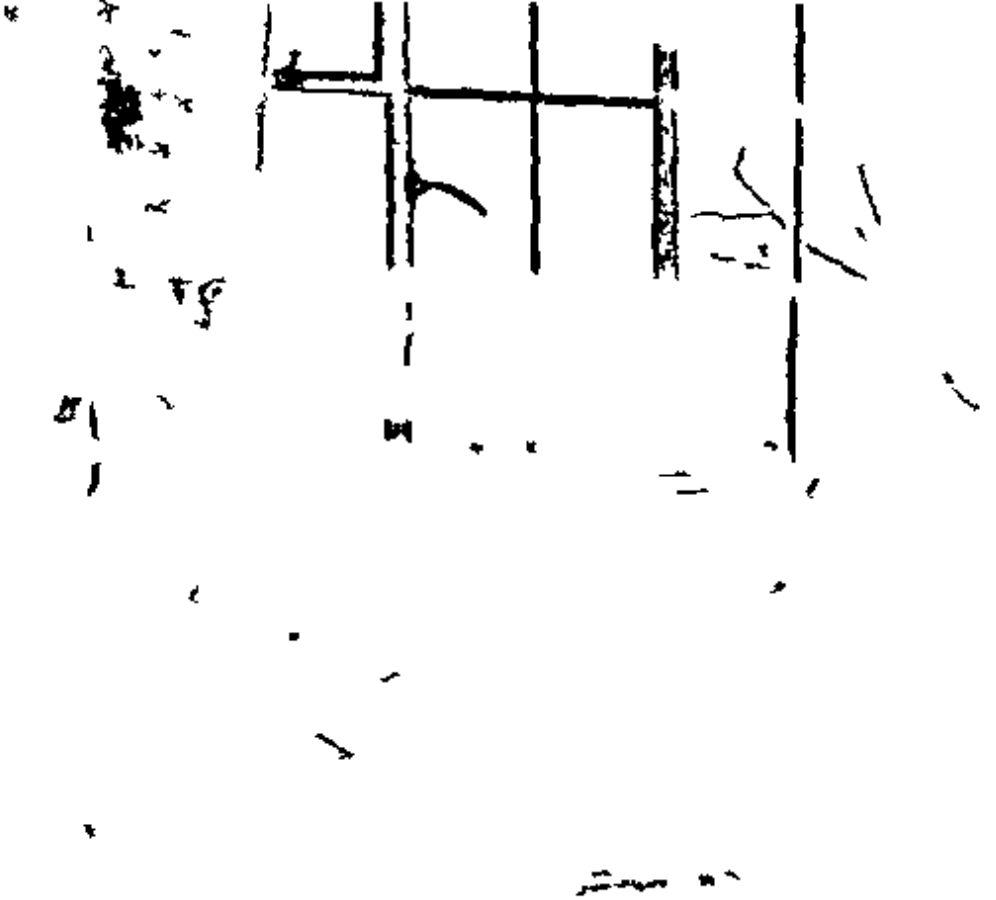


STREET SCENES need careful preparat on and qu ck act on at the right moment to produce good al ve pictures Focus, stop and shutter must be pre-set and you should carry a lenshood on the lens to be able to turn in any d rect on w thout fear of unwanted l ght on the

lens Have the p cture ready assembled in your eye before po nting the camera f you search for it through the f nder—you will have attracted attention and lost an opportun ty —Photographs by B Alf er (page 160) and *Hugo van Wadenoyen* (page 161)

HOLIDAY SNAPSHOTS w ll catch more of the hol day spir t in human faces and posture than in all the backdrop of mountains lakes and cathe drals. Plenty of people have tried to get their whole holiday party plus Buckingham Palace on one negat ve but nobody ever made a decent

p cture that way Do one th ng at a t me If it s to be a snapshot of your friends you had better have only just a fringe of the scene around them Get as close as you can w th the least poss ble fuss and take them unawares —Photographs by *P Wolff* (p 162) and *D Bellon* (page 163)



the people sort themselves out and relax Just to ease the tension make a fake exposure or two and try the final picture when they have almost forgotten about it all Should light conditions compel you to ask them to hold it do so only if the positions can be held without an effort.—Phot. by Cecil Beaton (page 164) and *H van Wadenoyen* (page 165)

CHILDREN are easy to photograph Should you and your camera be strangers to them first get acquainted Give them something to play with a book, paper and pencil some toy You want an assistant who is good at tricks or telling stories if big eyes and startled expressions make the sort of pictures you are after Keep the camera at the children s own level to avoid giant heads on dwarfed bodies Stop and focus are better pre-set if you do not want to miss the best shots For indoors.

fast lenses are preferable to fumbling with lamps or scaring the kids with flash Such large apertures give little depth of focus—but a sharp background is hardly ever needed You may even make your shutter speed somewhat slower than is safe for properly freezing " move ment a slight blurr in this sort of picture has charms of its own — Photographs by *H van Wadenoyen* (page 166) *Marian Reismann* (page 167) *Hugo van Wadenoyen* (page 168) *Torkel Korling* (page 169)

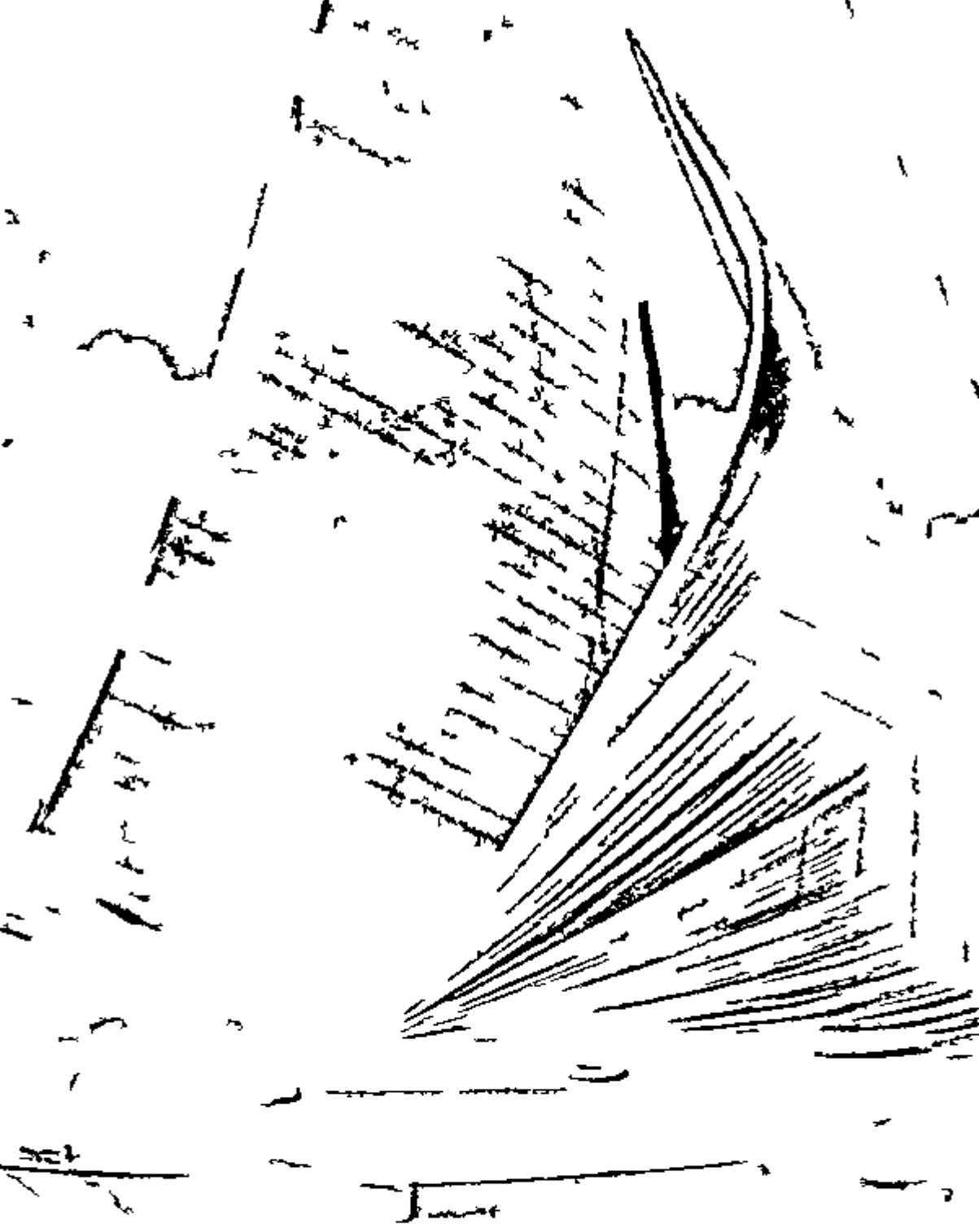
CLOSE UP PORTRAITS are not quite as simple to take as they look With the cheaper type of camera and its average lens it is better to keep some distance away from the model and get an enlargement from a portion of the negat ve At close range you almost inevitably picture over l fe-size noses and hands Genuine close-up portraits are better

made w th portrait lenses of long sh focal length and of soft def n t on (fo lad es) The plainer the backg ound the better If you cannot have ft pfa n leave it out of focus For character use s de light for smoothness the l ght should be more from the front —Photographs by Douglas Glass (page 170) H Go ny (page 171)

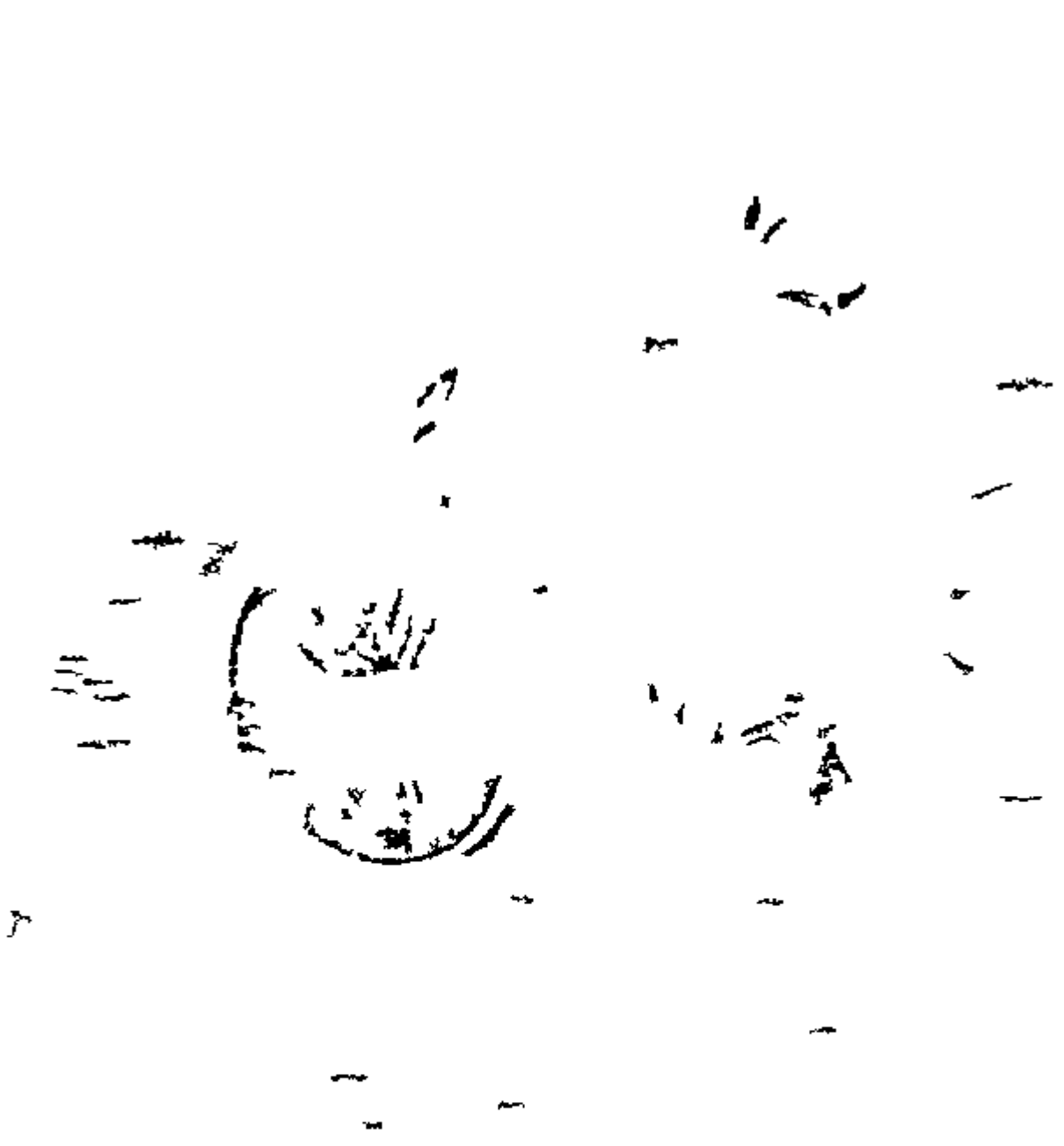
ANIMALS require pat ent approach You cannot stage Nature if you do it will cease to be natural Nobody can hope to become a success ful animal photographer without some knowledge of animal habits and haunts Search for the best point of view if possible for one that ensures plain background and side light to draw modell ng Sort out

your technique (focus stop and shutter speed) well in advance Unless you take domestic animals or work in a Zoo (where you must get right up to the nets and bars to avoid showing them) lenses of longish focal length are needed to get large pictures at some distance Wherever

you stand keep quiet and wait for your chance Motion is least blurred when photographed coming towards the camera Photographs by *H Gorny* (page 172) *Oliver G Pike* (page 173) *H Gorny* (page 174) *Yllo* (page 175) and *Unknown Photographer* (page 176).



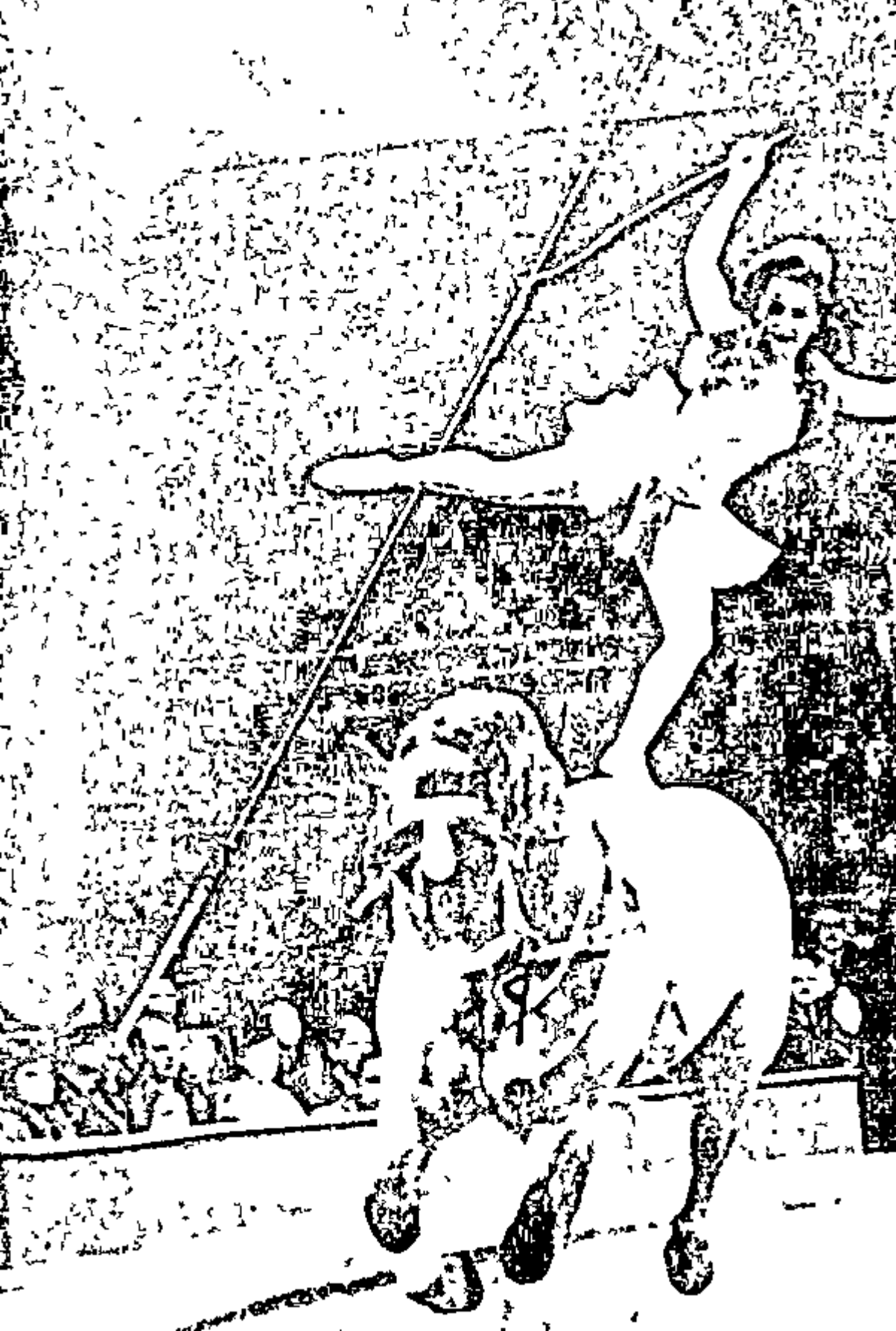
SPORTS photography cannot succeed without some experience of the kind of sport photographed You must know what to expect where to expect it and when Pre focus at the critical distance and stop the lens down to ensure a safety zone of sharp definition Pre set the shutter so as to freeze the speed at the rate expected If either your equipment or

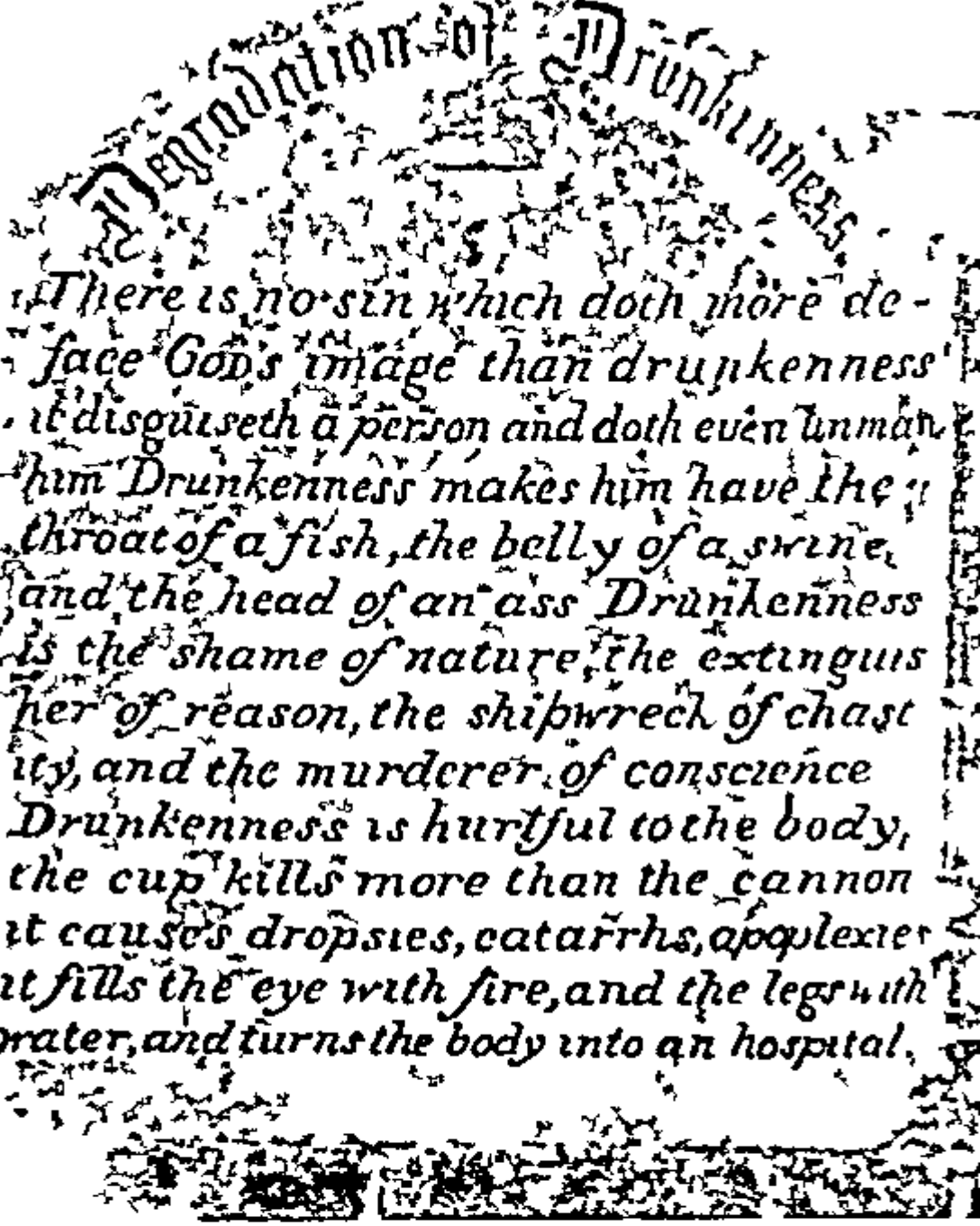


I ght cond tions conf ne you to slower exposure times than the rate of speed would demand take an oblique viewing angle to the d rection of the moving subject or wait for the movement to slow down for changing its direction or swing the camera In step with the moving subject while you expose —Photographs by *Unknown Photographers*

SHOW photography will succeed only from good seats with fast lenses and if you have seen that show before Theatrical lighting is difficult to judge and often calculated to be uneven and so you are not likely to hit the correct exposure without trying to do it in more than one way As every bit of the speed of the lens will be needed you cannot stop down much and so will have to pre focus carefully This is where range finders score ——Photographs by *Lancelot Vining* (pages 180 181)

FLOWERS must be carefully illuminated to retain some of their colourful charm in black and white photographs Both outdoors and indoors reflecting screens are needed to throw light wherever there is too much shadow Again screens are called for to provide even backgrounds and to protect the plant from the wind when working in the open (All the screens can simply be made from pieces of flexible cardboard fastened to a couple of sticks)—Photographs by *Van de Poll* (page 182) and *C W Teager* (page 183)





COPYING Approach as close as poss ble to f ll the f nder frame If necessary use auxil ary close up lenses D ffused l ght s best The camera should be carefully centred and levelled in l ne w th the sub ject. Strong f lters are often necessary to get not very leg ble w t ng n strong contrast to ts background —Photograph by *H S Newcombe* F R P S

or he may sit facing the window in which case no reflector is needed The camera may then be placed either in front or to one side of the window If two windows are available in one wall the sitter should be placed between them so that both front and back lighting is given a reflector should be used to lighten the shadow side and the camera can be used either parallel with the windows or pointing slightly away from them into the room If the windows are at an angle to each other the sitter should be placed in the corner between them and looking into the room The reflector is placed facing the corner while the camera can be put between a window and a reflector *Artificial Light* a good background is supplied by a self-coloured wall a piece of light or dark cloth stretched taut or simply the frame of an open door leading into an unlighted room The sitter should be about 3 ft. away from the background Even with a slow lens the exposure time will be fairly short, particularly when two lamps are used With a fast pan film f 6.3 the lamps about 5 ft. from the subject, 1/25th sec. will suffice One can straddle a chair supporting the camera on the chair back and so dispense with a tripod If one lamp only is available a reflector must be used to lighten the shadows The position will be the same as for daylight indoors, the lamp being substituted for the window When two lamps are employed one should be used as a main light source while the other one farther away should lighten the shadows. Different lamp positions can give different effects Do not be afraid therefore of moving your lights or the subject or the camera. The film to be used for indoor portraits must be the fast panchromatic type to allow of short exposure times Where ample light or wide aperture lenses are available the slower pan film with a reduced red-sensitivity is preferable in order to produce true colour rendering and finer grain For daylight portraits no filter is required while in artificial light, particularly with the fast pan film a light blue filter can be used This will reduce the red sensitivity and therefore darken lips which otherwise would appear too pale and lighten the colour of blue eyes

Two good books on this subject are Photographing People by H van Wadenoyen and Lighting for Portraiture by Walter Nurnberg Photo Guides devoted to the same fields All About Portraits All About One Lamp Only and All About the Second Lamp —all three by H van Wadenoyen—as well as Lighting for Glamour by W Nurnberg

REPRODUCTION (COPYING).—With the normal rollfilm camera which does not focus at less than about 3 ft. we have to employ a close up lens (See page 51) It is important to know the field that is covered when using the close-up lens as the viewfinder will no longer be correct at these short distances. While the exact field varies with focal length and negative size the average for the normal camera is

focusing to 3 ft. without supplementary lens the field covered is 18 × 24 in
focusing to 1 7 ft. with supplementary lens plus 1 the field covered is about 9 × 12 in
focusing to 1 1 ft with supplementary lens plus 2 the field covered is about 5½ × 8 in

p 57) In athletics, conditions are as a rule simplified because the position of the athlete is fixed or at least can easily be pre-determined In athletics, too there is always a dead point of movement which usually coincides with the moment of greatest interest. Therefore the distance may be set beforehand and the exposure time will not have to be too fast, speeds of 1/100 to 1/200 sec. being adequate for reasonably close-up pictures. Where movements are taken it has to be borne in mind that arms and legs move with at least twice the speed of the athlete s body as a whole The direction of the movement plays an important part in all sports pictures. For fast movements or where one s shutter only allows of comparatively slow speeds it is essential to avoid snapping at *right angles to the moving subject, but to take the movement* towards (or away from) the camera.

A good book in which there is much on this subject is My Way with the Miniature by Lancelot Vining and the Photo Guide All About Sports and Games by the same author The Photo Guide All About the Right Moment, by Alex Strasser is almost entirely devoted to this

TECHNICAL SUBJECTS.—Technical subjects such as machinery with its component parts the technical and industrial processes, etc.—require first and foremost a clear sharp and detailed rendering To get this accurate focusing on to the main part is essential adequate stopping down to cover sufficient depth of field will almost always necessitate the use of a tripod and the camera should be exactly level in order to show true perspective. The exposure time should be determined with the greatest possible care for the *shadow* parts which should still show all details. The illumination has to be arranged so that no deep shadows occur these might be helpful in producing a pictorial effect but are definitely not useful in a technical record Where artificial illumination can be arranged a shadowless picture can be produced by swinging the lamp from behind the camera in a large semi circle (with the camera position as centre) To show the subject material clearly a slow speed film of fine grain has to be used Development should be done in a fine-grain developer Subjects which show great contrast or have to be photographed in their natural surroundings—which more often than not include contrasty lighting—are best treated in a compensating developer of which the Pyrocatechin formula on page 224 is a good example For small technical subjects one should refer to what is said under Reproduction on page 185. For large technical subjects outdoors and indoors much of the advice given for Architecture (see page 146) may be applied always taking into consideration the essential rules given above

More on this subject can be found in Lighting for Photography by Walter Nurnberg and in Photographing Machinery by B Alfieri

TRAVELLING WITH THE CAMERA.—The photographic success of your travels is decided beforehand at home before you set out. (1) Has the camera been tested by your dealer ? Give him a list of what you want tested (*a*) Shutter functioning ? (*b*) Bellows light tight ? (*c*) Lens clean ? (*d*) Distance scale accurate ? (*e*) Rangefinder

accurate ? (2) Have you given your holiday address to your dealer ? Arrange to send him your first spools for development and he should report back immediately as to the results This is sound insurance against mishaps which may occur in unfamiliar circumstances (3) Have you taken a test film lately ? It is just as well to make sure in a practical way that your equipment is sound (4) Stick a note into the camera case with the zone-focus settings on page 46 (5) If you do not feel very much " at home " with the question of exposure, it is just as well to copy out the simplified exposure table on page 41 on a card and keep it handy in the camera case (6) Be firm, do not buy films about which you know nothing not that they are necessarily inferior, but they may require different treatment and exposure

Much of the books, " Hundred Thousand Exposures ' by E O Hoppé and " Living on my Camera " by J Allan Cash, is devoted to travelling photography There is also a long chapter on it in ' 35 mm Phototechnique," by H S Newcombe

TROPICAL PHOTOGRAPHY.—It is a mistake to assume that no exposure can be too short under a tropical sun Both reason and experience show that one can rely on the photo-electric meter as well as on exposure charts in so far as they apply to the latitudes in question The light in tropical countries is deceiving as far as street scenes and architecture are concerned Although the intense brightness of the sunny parts might induce us to give very short exposures, this would be wrong for here, as everywhere else, we have to adhere to the principle expose with due regard to the shadows *In sunny countries* these shadows are relatively all the darker The best rule is to take the middle exposure between the number indicated for the shadows and the one for the sunny parts There is no great difficulty about material Tropical packing of film is only required in damp climates One should take the *precaution to keep all films whether exposed or unexposed,* in a tin which can be hermetically sealed A biscuit tin sealed with medical adhesive plaster will do the trick Unexposed material will keep quite well while exposed film should be processed as soon as possible as the latent image tends to fade While under the most unfavourable conditions this could happen within a few days In most cases the exposed films are quite safe for a month or so If one wants to develop one s films no difficulties need arise provided that baths developer, fixer and washing water can be cooled to the same temperature But it is better to work with the prevailing high temperature than to have appreciable change of temperature from bath to bath A ' tropical developer should be used and Kodak D K 15 in powder form should be found most useful After developing a short rinse in water should be given and the negative immersed in a tropical hardener (Kodak S B 4) for three minutes After hardening fix for at least ten minutes in a hardening fixing bath (Kodak F 5) and then wash in running water for 10 to 15 minutes (or in three changes of water of 5 minutes each) To dry wipe both sides of the negative with a swab of wet cotton-wool, then dry in a current of air or the draught from a fan—if necessary, keeping insects away with mosquito netting

WOODS.—As in landscape photography, it will be best to concentrate on detail, to select, for instance, a small group of trees standing out against a background of cloudy sky, which will suggest more than a whole wood More worth while but technically more difficult to tackle will be scenes in woods : a few tall tree trunks between which the rays of the sun cast interesting light patches on the undergrowth, the morning mist slowly clearing, and so on Panchromatic film is needed to cope with the large number of fine-tone gradations, while a light or medium filter will help to disentangle the various shades of brown and green. Careful use of the light falling through the trees is the most important factor While pictures with the light are usually uninteresting, side light or photographs taken against-the-light will show up the rays of the sun against a dark background and the irritating details will be smoothed out. The exposure time should be carefully determined for the darkest parts, which should show detail. One has to take into account that woods and particularly undergrowth are very dark even on a bright day and the predominating brown and green colours swallow most of the incoming light.

A Photo Guide with information on this subject is "All About Landscapes," by H van Wadenoyen and much on this subject can be found in the book "Amateurs Just Like You"

DARK-ROOM

A few simple tips for those who like to develop and print their own films. In order to follow these instructions you need no dark-room, very little apparatus and very few chemicals

TWO METHODS

From the " Negative " to the " Positive "

When the film has been exposed you cannot tell from examining the emulsion that anything has happened Yet there has been a change, the fleeting image thrown by the lens has left its mark on the film Not that anything can be seen of this impression even under the most powerful magnifying glass It must be treated chemically before it appears And then the details appear gradually, one by one until the picture is complete

But it is a funny kind of picture All the things which in real life were white appear black on the film, and the dark parts of the real object look light. People we know very well look like negroes, while Blackie the cat looks like Snowball next door

This topsy turvy state of affairs however, need cause no worry, for a second process produces from this " negative " as many " positives " as you require, with the blacks and whites where they should be

One can even make enlargements in which the picture is much bigger than the negative and much more striking than the small picture

The Easy Way

The treatment of exposed films requires a certain amount of apparatus a few chemicals and a little knowledge Yet thousands of amateurs solve the difficulty by handing their films over to experts who take charge of the developing printing and enlarging And for busy people there is no better way for getting good results

But even these very people could usefully acquaint themselves with the contents of the following pages. The knowledge which they may acquire in this way will be helpful in putting their orders in a more precise form than they did before.

More Fun This Way

But other people get a great deal of satisfaction out of the hours they spend developing, printing and enlarging their own films. The enjoyment they get from their labours more than compensates them for any failures. What do a few fuzzy negatives, a few "flat" prints matter if they can be said to be "all my own work"? The method may be more laborious, but it's much more fun.

The Usual Method

In most handbooks on photography for beginners the procedure adopted is always the same. First, the amateur is shown how to obtain a negative from the exposed film or plate and then how to make paper prints and enlargements from the negative. Now this is a nice logical procedure, because one must, of course, have a negative before one can get a positive from it. But even so, it is questionable whether this is the best way of going about things for the beginner.

For if there is anything difficult about photography it is undoubtedly the development of negatives. The emulsion coating on films or plates is not nearly so resistant as that of printing paper. And if in the course of development there is a little too much here and not quite enough there, the negative is already damaged, if not entirely spoiled. And a lost negative means that everything else is lost, too.

A spoiled print on the other hand, is by no means the end of everything for another one can easily be obtained from the negative, this time without making any mistakes With prints, in fact, it is a case of "If at first you don't succeed . . "

A New Suggestion

From the above considerations comes the rather unusual suggestion which follows Give your films to an expert photographer to be developed and begin your own part of the business with printing, developing and fixing the paper copies When you are an old hand at this, you can go on to enlargements, and last of all—when all the other manipulations come naturally to you—undertake the development of your films or plates

This method, which is the exact opposite of the one usually recommended, is undoubtedly the safest It leads you step by step from the easier to the more difficult and arranges things so that the mistakes and failures which inevitably occur at the beginning do not affect the negative, which is often irreplaceable but only the copy

Variations

For owners of miniature cameras the order of procedure is somewhat different They are not very interested in prints made direct from the negative, for there is not much to be seen on a picture 24 × 36 mm (1 × 1½") So they usually leave prints alone and go straight on to enlargements On the other hand, there are amateurs who are satisfied with prints because their camera gives them pictures of 6 × 6 cm (2½ × 2½"), 6 × 9 cm (3½ × 2½") or even bigger And therefore—more's the pity—they are

not interested in enlargements, and can proceed direct from printing to developing their own films.

Unnecessary Expense

Learned men, familiar with every aspect of every branch of photography, occasionally produce treatises in which they describe all the gear which they consider necessary for home developing and printing. In the first place they prescribe a dark-room, equipped, if possible, with heating installation and running water. Then comes a respectably long list of apparatus and a fearfully long catalogue of chemicals.

Now all this is very disheartening for the beginner. He becomes anxious, for, having a tremendous respect for anything he sees in print, he imagines that all these highly-desirable luxuries are necessities. So he sits down with pencil and paper and begins to reckon the cost. The total is staggering!

Dark-room not Indispensable

Fortunately it is easy to demonstrate how a dark-room—(what flat-dweller can find the space for a dark-room ?)—and all sorts of *comfort moderne* can be dispensed with, and how apparatus and chemicals can be reduced to a minimum. And since we are only going to provide in the first place for printing, the number of things to be purchased is all the smaller, and the outlay correspondingly modest.

The other things which will be wanted later on for enlarging, and for developing and fixing films and plates, can be acquired gradually. Then all the luxuries will come along bit by bit, for although they are not indispensable, they do add to the ease and accuracy of one's work.

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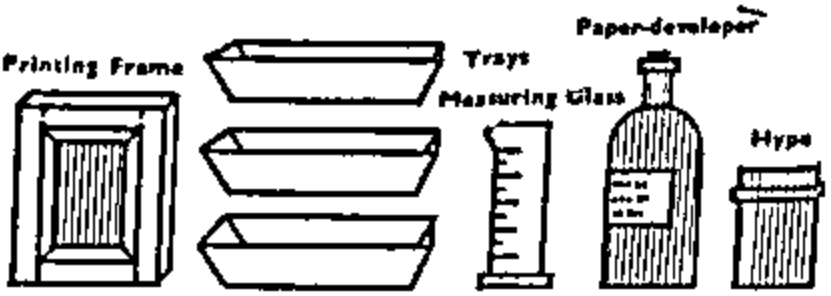
FIRST OF ALL—PRINTS

Things you need



You will need a printing frame in which you put your negative and the sensitive printing paper, three dishes (trays) and a measuring glass containing 100 cc. (about 3½ fluid ounces) And that completes all the essential apparatus

The printing frame must, of course, be the right size to take the film, but it is better to make the trays too big so that they can be used later on for enlargements if required They should be big enough to take postcard size (5 × 4") paper comfortably, or, still better, large enough for the ¼-plate (6½ × 4¼") size, since prices do not rise proportionately to the size of tray

As chemicals you will require a paper developer, in powder or liquid form, with directions for making-up, and a box of Acid-hypo fixing salt And that is all

For developing prints a dark-room is easily dispensed with For one thing most people have their living to earn during the day, so that they have to do their photography at night, when it is dark You choose a corner of the room as far away from the light as possible, but as this type of paper is not highly sensitive, it does not matter very much if a glimmer of light from the other end of the room finds its way on to your working table

It is advisable to have two pieces of cardboard in readiness to cover the developing and fixing trays, and to work in

your own shadow. In this way you will not need any special yellow light to work by. If you procure a yellow dark-room bulb, you will be able to have considerably more light on the dishes.

All Ready

First cover the table on which you are working with newspaper to protect it from stains which might result from spilled developer or hypo. Then place your three dishes next to each other.

In the first dish you have 100 cc. (3½ fluid ounces) of developing solution made up according to the instructions on the bottle.

The second one is filled fairly full with clean water.

The third contains the fixing solution, again not too shallow.

And now you can start. It goes without saying that you don't wear your best suit for the work. Some of the chemicals leave nasty stains.

Printing

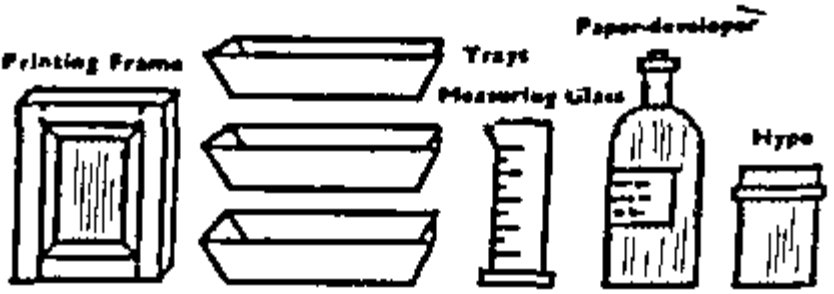
Under the protection of your own shadow you open a box of what is still known by the old-fashioned name of "gaslight" paper, take out one sheet, and put the remainder, carefully wrapped, back into the box where it is safe from stray light.

You have already put your film, dull side up, into the printing frame. You now place the paper on the emulsion side (the dull side) of the negative. As you will begin by using glossy paper there is very little danger of putting it in the frame wrong-side-up. The glossy surface, of course, must be next to the emulsion of the film

Having assured yourself that the film and printing paper have been correctly placed, you close the frame, cover it

FIRST OF ALL—PRINTS

Things you need



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ENLARGEMENTS ARE STILL BETTER

Prints are Too Small

Most cameras nowadays give quite small prints Even on the quarter-plate ($4\frac{1}{4} \times 3\frac{1}{4}$"$=8.2 \times 10.8$ cm) size, people and other details are extremely small Yet the $3\frac{1}{4} \times 2\frac{1}{4}$" ($6 \times 9$ cm) size is almost the largest one in general use to-day

The result is that many amateurs are amazed by an enlargement of a section from one of their own negatives They can hardly believe that they took the picture themselves The result is so vastly superior to the print, that the author of it does not recognise his own child And once the man who hitherto has always found contact prints quite good enough for him is bitten by the enthusiasm for enlarging, his printing frame grows rusty from lack of use He hardly condescends to look at small prints For him it is enlargements or nothing, and he is quite right, too For the joy of photography begins all over again for the amateur who once discovers the possibilities of enlarging

Additional Apparatus

The extra material does not amount to much Many of the things required for enlarging are the same as those which have already served for printing

The trays, for example, were chosen at the very beginning to take the half plate size of paper ($6\frac{1}{2} \times 4\frac{3}{4}$" or 13 × 18 cm continental size) with ease You can use, too, your same measuring glass and the same chemicals, developer and fixing solution

The new apparatus consists of the enlarger which although not precisely inexpensive, is not nearly so costly as many people imagine

The Printing Paper

Since contact prints are rather small it is better to use paper with a glossy surface. This gives the best and clearest reproduction of detail in small pictures It is only when one is after "atmosphere," in landscapes or in against the-light pictures, for example, that a matt surface is preferable.

One can also get additional effect by using tinted paper, the most widely-used tone being a discreet creamy-yellow. There are other tints to be had, but it is important to choose one that suits the subject. A snow-scene on green paper, for example, would not be a success, nor would most people appreciate their portrait in this particular shade.

Hard or Soft ?

Certain faults in the negative can be corrected to some degree by using the right kind of printing paper. There are no fewer than seven different degrees of "hardness" (*gradation*), most of which exist both for matt and for glossy paper, for white and cream

For a film that has been *correctly exposed* and developed, which has the normal gradations from light to dark, a *normal paper* is used

A *hard negative*, on the other hand, that is, one with great contrast in light and shade (page 217) requires a *soft paper* which tones down these extremes

Conversely, a *flat negative* (page 218), on account of its lack of light contrasts, needs a *hard* or an *extra-hard paper.*

In apparently hopeless cases one can even try *extra-soft* or *super-hard* papers

Both *dense* and *thin negatives* (page 218) are printed on *normal*, or, at the most, on *hard paper*, and the time is regulated according to the density of the film If it is over-exposed, that is, densely covered, the time allowed for printing must be long, whereas the thinly-covered negative will print quickly

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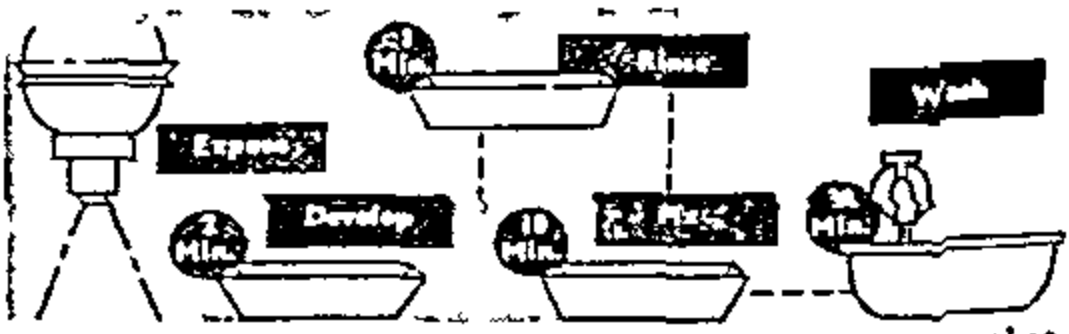
Then you will need a special means of lighting your work-table, as enlargement paper is rather highly sensitive. Whereas it was quite sufficient, working with contact printing paper to protect the emulsion by your own shadow, you will now need filtered light, either red or light-green The latter is preferable as it gives a much brighter light to work in and makes the task of estimating the density of the enlargement much easier The cheapest system is provided by the coloured glass covers (globes) which can simply be screwed over the bulb of an ordinary lamp Even handier are the special dark-room bulbs with which the usual bulb is replaced

Just Like Printing !



The procedure for enlargements is just the same as that for making contact prints. first expose, then develop, rinse, fix, wash Even the times are the same. The paper is exposed long enough for the image to appear after developing for a maximum of two minutes, then rinsed for one minute and left for 10 minutes in the fixing bath Finally the enlargement must be very thoroughly washed and dried. The final washing must, of course, be even more thorough than it was in the case of small prints, and the volume of water used correspondingly greater.

Focus Sharply

A great deal of the knowledge gained in making contact prints is useful for enlarging But the actual printing, that

is, the exposure of the paper to the light, requires special care

There is nothing very difficult about it, however You put your film in the enlarger and switch on the light. An enlarged image of your negative now appears on the baseboard of the apparatus To get the details as clear as possible, you lay a sheet of white paper where you will subsequently put your sensitive paper Some enlargers have an automatic self focusing device, but with others the focusing must be adjusted by hand and eye

The greater the distance between negative and paper, the larger the image But the beginner should be satisfied with moderate magnification If, for example, he has hitherto contented himself with prints of V P size (2½ × 1⅝" or 4 × 6½ cm continental size), he will probably find some satisfaction in an enlargement of ¼-plate (4¼ × 3¼" = 8 2 × 10 8 cm) This represents an almost four-fold magnification of the 24 × 36 mm (1 × 1½") picture given by the miniature camera

But it is not necessary to drag in every detail of the original negative It is much better to enlarge one section only. Not only is the enlarged section more satisfactory in itself, but it may be possible at the same time to leave any blemishes on the film out of the picture

Once the image on the white sheet of paper is sharp, and the section to be enlarged has been decided on, the lamp is switched off and by the red or green light of your special bulb, the sensitive enlarging paper is substituted for the sheet of ordinary paper When the paper is firmly fixed in position on the board, either with drawing pins, but, better still with the special clips which are sold for the purpose, the light is switched on

Time of Exposure

The length of time required to produce a well-defined print must depend on several factors the density of the negative, the size of enlargement desired, the strength of

the lamp in the enlarger, and even the sensitivity of the paper. But for practical purposes the only variable factors are the negative, and the size of the enlargement.

As in the case of contact prints, the time must be fixed by experiment. A 20 second exposure is given first and this figure is subsequently reduced or increased according to the behaviour of the print in the developer. If the image appears with a rush, and if even the parts which should remain white, appear grey, the time of exposure must be shortened. If the image appears very slowly, exposure was insufficient

When examining the developed strip, the highest lights should be watched, as they are an indication of the exposure
1. Where the high-lights are white and chalky, and the shadows are a medium grey without any full black, exposure was too short
2. Where the high-lights are just white, and show full details, while the very densest shadows of the image are just full black and also show details, the exposure was correct
3 Where the high-lights are veiled over, and appear grey, and the shadow details are too dark to be seen, the exposure was too long

When you have made enlargements from fifty or so different negatives, you will have had enough experience of various densities and the various exposures required, to proceed to make bigger enlargements from your films You can get pictures of even 10" × 8" from the right negative

Not every negative can bear enlargement to this extent

Absolutely sharp definition is, of course, essential, for even the smallest degree of blurring on the small negative will become visible on the enlarged print

Another thing to take into account if the magnification is large is that the grain of the film is apt to become visible For this reason a fine grain film may be necessary (See page 57)

The FOCAL ENLARGING CHART with its test exposure negative will help you to get good enlargements under all conditions

The Right Paper

When a negative is enlarged its image is spread over a wide area On its way to the enlarging paper it has to pass a wide cone of air, filled with more or less dust which, correspondingly weakens the enlargement

So even *normal* negatives may need a *hard* paper for enlarging purposes whereas a *hard* negative will enlarge well on *normal* paper, which will do the necessary softening For *flat* negatives a hard paper is not enough , the *extra hard* variety must be used

The reader will see that this is rather different from what happens with contact prints

As far as the density of the negative is concerned however, the same rules apply as for ordinary printing the denser the negative the longer the exposure of the paper to the light If a negative is exceptionally dense it is preferable to reduce it first (see page 219) rather than to increase the time of exposure The prolonged stay beneath the lamp might result in over heating the emulsion

Hard enlarging paper such as can be recommended for normal negatives unfortunately emphasises not only the desired light and shade contrasts but the grain of the emulsion For this reason it is better if very big enlargements are required to use "normal" paper

Matt or Glossy?

For clear reproduction on all sizes up to full plate ($8\frac{1}{2} \times 6\frac{1}{2}$") or 10" × 8" (18 × 24 cm continental size) use a paper with a glossy surface Just as you would do in the case of contact prints A high gloss can be imparted by drying pressed against a glazing plate

For larger sizes and in cases where something more than a strictly practical clearness is sought, enlargements are best made on matt or semi matt paper which can be white or

cream according to the subject of the picture The coarser-grained papers are only suitable for the larger sizes The rough surface serves to some extent to conceal the grain from the film and gives interest to large uniform surfaces in the picture.

Toning Rarely Used

Enlargements can be toned in a variety of hues, either by using a toning-developer or, more often, by a process involving first bleaching and then toning It is a treatment to be applied very sparingly, as the result may so easily be in contradiction to the canons of good taste No picture can be saved by toning, but a good enlargement may be ruined if toned unwisely The formula of a reliable Brown-developer is given on page 212.

Retouching Even Rarer

The amateur need not bother his head about retouching in the bad old sense, which involved an interference with the whole character of the picture

The best way to avoid the necessity for retouching is to handle the film so carefully that any scratches, which would later show up on the enlargement, are avoided The great enemy is dust, which settles on the emulsion of the negative and produces white spots on the dark parts of the picture

But as it is well-nigh impossible to abolish specks of dust altogether, one should be prepared to make white marks invisible by what is known as "spotting" Matt papers will take marks from a very soft pencil quite well Or else the spot can be obliterated by putting a number of tiny dots of paint on the offending part by means of a fine sable brush

Glossy paper can also be treated with the brush but care

must be taken to see that the paint used is one that dries glossy

If black marks, due to some damage to the emulsion, appear on the enlargement, they must be carefully scraped with a razor-blade and then coloured to the correct tone with water-colour. Retouching sets can be bought for a few pence

The Finishing Touch

The saying about spoiling the ship for a ha'porth of tar applies to photography as well Having lavished a great deal of care on exposing, developing and producing your enlargements, it would be a pity not to find a way of keeping the pictures clean and easily available

You can either invest in one of the many handsome "stick in" albums or, better still, mount each enlargement on separate cardboard sheets which you can keep together in a suitable file or folder This loose-leaf system allows for rearrangements and additions *ad lib*

The enlargements can be stuck on to the mount with an adhesive made for photographic purposes (free from acids which in time would spoil the picture) or with transparent "corners" unless the clean working "Dry mounting tissue" is preferred

HINTS AND TIPS

Enlarger and Enlarging

A red filter can be useful in your enlarger It allows you to focus the picture on to the sensitive paper itself without affecting the emulsion An orange filter can be used for the same purpose

An over-exposed film, the denser the better, is useful for enlargers which are not fitted with automatic focusing Two diagonal cuts are made in the emulsion with a pen knife, and the test negative is ready for use

An old trick for settling the question of exposure in printing or enlarging is to cover the printing frame or the enlarged image, as the case may be, with a piece of cardboard, leaving one strip free, and then second by second to expose an ever wider strip The whole sheet is developed and the correct time can be seen by comparing the various strips.

If miniature films (24 × 36 mm : 1 × 1½") are put into an enlarger made for films of a bigger size, the empty space in the negative holder must be blocked by a paper mask. Otherwise the enlargement will be spoiled by stray beams of light

"Hard" or "soft" papers can do no more than improve the tone-gradation of black and white pictures, whether prints or enlargements That is, a picture from a hard negative can be softened somewhat, and vice versa. But thick or thin negatives, that is, those with too much, or too little, density, demand a longer or shorter printing on normal or, possibly, hard paper.

An enlargement from a hard negative will naturally show heavy masses of black in the shadows and large white blanks in the high-lights The missing details in the light parts may appear if the exposure is prolonged But this will make the shadows even more solid

So many photographers prolong the exposure and cover the dark parts of the enlargement with their hand Better still, since the hand is not likely to fit the required shape, a number of paper masks, cut to all kinds of fantastic outlines, are prepared beforehand, so that an area of almost any shape can be shaded To prevent hard dividing lines between the shaded and unshaded parts of the picture, the mask is moved slightly from side to side

Coarse grain can be reduced during enlarging by placing a ground glass plate, smooth side up, on the enlarging paper

For enlargers with condensers an opal disc on the upper condenser lens gives softer reproduction

Normal photographs can be softened during enlargement by placing a soft-focus screen in front of the enlarger lens Another method consists in stretching a piece of thin net or silk in front

of the lens But none of these post-development processes is quite satisfactory If soft outlines are sought it is better to fit the soft focus apparatus at the time of taking the photograph
(See page 81)

Although a small stop cannot help to correct a negative which is out of focus, it can increase the depth of focus of the lens in the enlarger This means that any slight error in focusing on to the baseboard is of no account

The small stop, with the correspondingly deeper band of sharp definition, is essential when "vanishing lines" on buildings, due to the tilting of the camera, are to be suppressed Here the baseboard is purposely set at an angle to the negative, but it is essential for every part of the paper to be in focus

It is quite easy to make a gentle skl ing slope into a break neck descent by taking an oblique section of the picture But be careful that there are no perpendicular objects, such as houses or towers, to give the trick away As a matter of fact, the practised eye is rarely taken in by these artificially steep slopes Gravity has a knack of giving objects a certain poise which indicates at once how the plumb line falls in reality

You can use your enlarger for making photographs of pictures in books You first place any normal negative in the enlarger and focus it on to the page in question The dimensions of the negative show how much of the page will be reproduced in the subsequent photograph If the area is too small it can be enlarged by raising the lens

The negative is then replaced, in dark room conditions, by an orthochromatic plate or a section of pan film, emulsion side towards the lens Then the page of the book (uncovered of course) is illuminated by an ordinary electric bulb The exposure time must be fixed by experiment When the plate is developed you will be able to see whether the exposure was too long or too short and act accordingly

If the illustration to be reproduced is in colour, pan film is recommended This of course must not be loaded in the presence of red light Total darkness is best

If the experiment described above entails an exposure which is too short to be manageable, the time can be lengthened by using a thick yellow filter, or even a red one, as a "brake" This system can also be used in the preparation of lantern slides

Washing, Drying, Finishing the Print

It is of the utmost importance that paper prints and enlargements are thoroughly well washed so that no trace of the fixing bath remains in the fibre of the paper To do this without wasting water, place your vessel under a slowly running tap and put in it a rubber tube with one end near the bottom of the bowl and the other end hanging over the side and reaching below the level of the end in the water Begin the outflow by sucking the water to the free end of the tube This now acts as a siphon and draws off the soiled water from the bottom of the bowl while clean water is constantly supplied from the tap

The prints which should float about in the bowl, are anchored to cork clips

In one litre (20 oz) of fixing bath 300 ¼-plate prints may be safely fixed

If prints and enlargements are immersed for two or three minutes after fixing in a solution of 1 litre of water and 10 grams (154 3 grains) of anhydrous sodium carbonate (or 27 grams—about 1 ounce—of crystals), the paper will take the subsequent washing water better and be more thoroughly cleansed from traces of fixing salts.

A pleasing glossy surface can be obtained by pressing the wet prints, face downwards, with a rubber squeegee, on to a sheet of glass where they are left until they spring off by themselves The glass must be scrupulously clean, of course

Wet paper prints, left to themselves, take quite a long time to dry and even then are rolled up in a tube It is quite a business to straighten them out and press them until they lie flat A great deal of time and trouble can be saved by investing in an electric drying and glazing press

If the prints emerge from the press rolled instead of flat, it means that the press was over-heated. So switch off the current at the end of two minutes and allow another few minutes to complete the drying slowly.

Common paper sizes :

British Standard Sizes	Metric Equivalents	Nearest Continental standards
3½ × 2½ inch	8.25 × 5.7 cm	6 × 9 cm.
4½ × 3½ inch = (¼-plate)	10.8 × 8.25 cm.	9 × 12 cm.
5½ × 3½ inch = (Postcard)	13.9 × 8.75 cm.	9 × 14 cm.
6½ × 4½ inch = (½-plate)	16.5 × 12 cm.	13 × 18 cm.
8½ × 6½ inch = (1/1-plate)	21.5 × 16.5 cm.	18 × 24 cm.
10 × 8 inch	25.4 × 20 3 cm.	—
12 × 10 inch	30.4 × 25.4 cm	24 × 30 cm.
15 × 12 inch	38.1 × 30.4 cm	30 × 40 cm.

PRACTICAL FORMULÆ

Metol-Hydroquinone for Papers

Metol	9 gr.	1 grm.
Sodium sulphite (anhydrous) ...	220 gr.	25 grm.
Hydroquinone	40 gr.	4.5 grm.
Sodium carbonate (anhydrous) ...	150 gr.	17 grm.
Potassium bromide	9 gr.	1 grm.
Water : to	20 fluid oz.	1,000 ccm.

The above developer is used undiluted and gives pleasant neutral black tones on bromide and chlorobromide papers. It may also be used with ordinary contact printing chloride papers, but in this case the quantity of potassium bromide should be doubled in order to stop any tendency to fog.

In the fresh developer, bromide papers will develop in approximately 2½ minutes. Chlorobromide papers will require a rather shorter time, while developing out chloride papers of medium sensitivity will require about 90 seconds.

The developer is exceedingly economical, and even when it turns yellowish-brown in colour it is by no means worked out. The colour merely implies that the time of development must be increased, perhaps up to twice the original time.

If the experiment described above entails an exposure which is too short to be manageable, the time can be lengthened by using a thick yellow filter, or even a red one, as a "brake". This system can also be used in the preparation of lantern slides

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The prints, which should float about in the bowl, are anchored to cork clips

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3½ × 2½ inch	8 25 × 5 7 cm	6 × 9 cm
4¼ × 3¼ inch = (¼-plate)	10 8 × 8 25 cm	9 × 12 cm
5½ × 3½ inch = (Postcard)	13 9 × 8 75 cm	9 × 14 cm
6½ × 4¼ inch = (½ plate)	16 5 × 12 cm	13 × 18 cm
8¼ × 6½ inch = (1/1 plate)	21 5 × 16 5 cm	18 × 24 cm
10 × 8 inch	25 4 × 20 3 cm	—
12 × 10 inch	30 4 × 25 4 cm	24 × 30 cm
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Potassium bromide	9 gr	1 grm.
Water to	20 fluid oz	1,000 ccm

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In the fresh developer, bromide papers will develop in approximately 2½ minutes Chlorobromide papers will require a rather shorter time, while developing out chloride papers of medium sensitivity will require about 90 seconds

The developer is exceedingly economical, and even when it turns yellowish brown in colour it is by no means worked out The colour merely implies that the time of development must be increased perhaps up to twice the original time

Blue-Black Paper Developer

Metol	18 *gr*	2 *grm*
Sodium sulphite (anhydrous)	220 *gr*	25 *grm*
Hydroquinone	53 *gr*	6 *grm*
Sodium carbonate (anhydrous)	306 *gr*	35 *grm*
Potassium bromide	7 *gr*	0 8 *grm*
Water to	20 *fluid oz*	1 000 *ccm*

The normal development time for the papers noted above at 64°F (18°C) is between 45 and 60 seconds

A cream paper base and blue-black tones do not go together a white base is usually more suitable

Warm Black Paper Developer

Metol	9 *gr*	1 *grm*
Sodium sulphite (anhydrous)	220 *gr*	25 *grm*
Hydroquinone	53 *gr*	6 *grm*
Sodium carbonate (anhydrous)	175 *gr*	20 *grm*
Potassium bromide	44 *gr*	5 *grm*
Water to	20 *fluid oz*	1 000 *ccm*

The development time at normal temperature is about 80 to 90 seconds The developer can be used over and over again until exhausted It is advisable to use the developer at a temperature some degrees higher than usual *i e* about 68 F (20°C) Not every paper is suitable for warm black tones the suitable papers belong to the *chlorobromide* class

As a rule warm tones are not pleasant on white paper Cream ivory and chamois papers are best

Brown Developer

Hydroquinone	½ *oz*	24 *grm*
Sodium sulphite cryst	⅝ *oz*	30 *grm*
Potassium carbonate	1⅝ *oz*	80 *grm*
Water up to	20 *oz*	1 000 *ccm*

For use dilute with four parts of water expose for three times the normal time and develop for f've to six minutes

Farmer s Reducer see page 226
Fixing Bath see page 226

AND LASTLY THE NEGATIVE

Experience Already Gained

As has been explained already, we leave the development of negatives to the last—though it is usually put first—because the emulsion is very delicate and may be ruined once and for all by unskilful handling Moreover, all the experience the beginner has gained in developing and fixing paper prints will stand him in good stead when he at last tackles films or plates

The order of events is the same as it was for printing and enlarging. developing, rinsing, fixing and so on, until the dry, finished picture—in this case a negative—lies before you

Individual Development Out-of-Date

A decade ago negatives were developed in the same way as prints and enlargements—one by one The plate was watched in course of development, the action of the developer stopped at the critical moment, and the developer itself strengthened or diluted according to the nature of the negative—whether usefully or not is another story

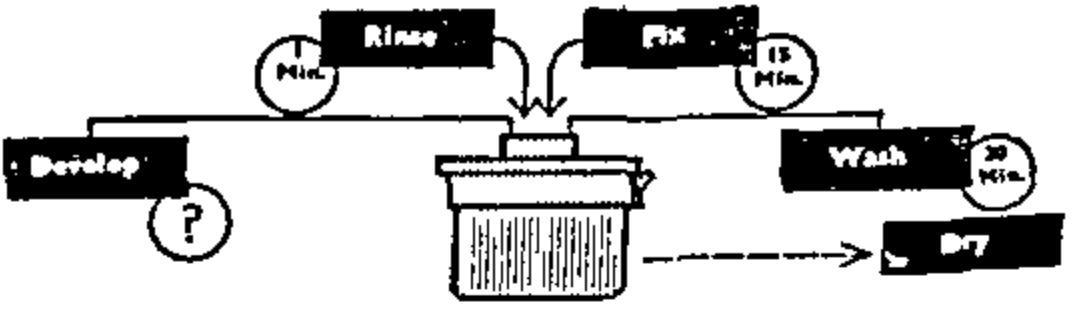
But nowadays 90 out of every 100 amateurs use roll-films, with the result that individual treatment for every film on the spool is impossible So we now develop our material "by the clock," whether we are dealing with roll-films, cut-films or plates We can no longer watch the course of development, but rely on our thermometer and our watch to give us accurate results

Any developer at 64 degrees F (18 degrees C) will produce in a given time a well-developed negative which, without examination, can be rinsed and fixed For this it is

essential that the film is reasonably accurately exposed But that is an essential condition even if the exposures are to be handled individually.

"Timed" development makes a dark-room superfluous. After arranging your dishes by ordinary artificial light, you switch off the lights and put your plate or cut film into the developer in darkness Rock gently, and at the end of the time indicated for development swill the negative and place it in the fixing bath. After a minute or so the light can be switched on again, provided the fixing dish is covered by a sheet of opaque cardboard

Tank Development



For developing roll-films you will need a special tank Some developing tanks can be loaded in daylight, so that the whole operation, including developing, rinsing and fixing can be done in the light. In other cases the film must be loaded in the dark, an operation that can be successfully performed by anyone at the second or third attempt. The cover is put on the tank and the remainder of the work can be done in daylight, with the film safely hidden away in the dark interior of the developing apparatus

To make sure that the developer is kept well mixed and gets to every part of the emulsion the tank is shaken gently from time to time during the developing process

After the allotted time for development, the developer is

poured off and pure water is run in until the tank is full After shaking and perhaps renewing the water once, you empty the tank and then fill it with the hypo solution which is allowed to remain for fifteen minutes. Finally clean water is run through the apparatus for half an hour to wash away all traces of the fixing bath

The film is then removed with great care from the tank, and freed from superfluous water by wiping it carefully on both sides with chamois leather Finally it is hung up to dry in a dust-free atmosphere Wooden clips, such as those intended for hanging out the washing, can be used to weight the end of the roll

Single-layer Films

Single-layer films and thin-layer films are more difficult to handle than the usual type For one thing they require far less time in the various baths, and, although the required time for development is given in the packet, it is extremely difficult not to over-develop The result is a hard negative The emulsion is more liable to damage by scratching, and so on, than the sturdier thick-layer type, but, on the other hand, it dries in half the time

The Suitable Developer

There is no lack of developers on the market. Of course you must use a negative developer a paper developer would ruin your films

If what is known as a " rapid developer " such as metol-hydroquinone is used, it must be considerably diluted

The best developers for the purpose are what are known as compensating developers, and if it is a question of making enlargements of any considerable size, one uses a special

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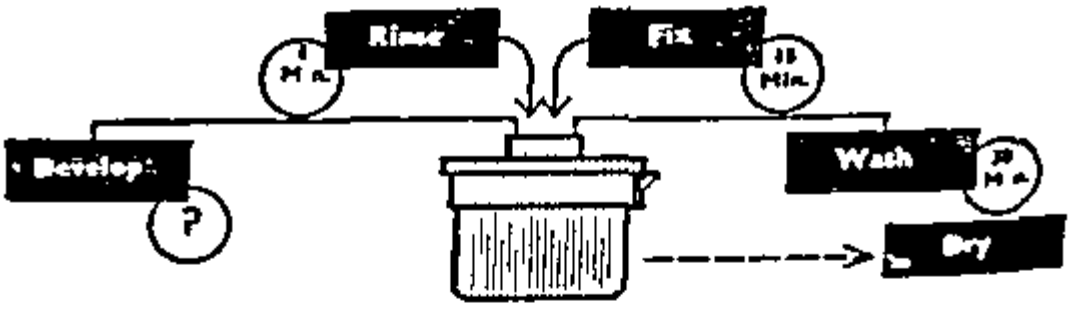

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The best developers for the purpose are what are known as *compensating developers*, and if it is a question of making enlargements of any considerable size, one uses a special

fine-grain developer, which possesses the additional advantage of being at the same time a compensating developer. This compensation, combined at least with soft development, is especially desirable in the case of roll-films on which exposures of differing degrees of density are met with side by side, some with strong light contrasts and others less strongly contrasted, but all requiring to be developed in the same bath within the same time.

A compensating developer should also be used in cases where the brightest portions of the picture come right next to the deepest shadows This is the case with against-the-sun pictures, interiors taken without additional lighting with all kinds of photos made by artificial light, and with pictures taken at night.

Once you have chosen a suitable developer stick to it for some time Even if the first results are unsatisfactory, the remedy is unlikely to be found by adopting a second, or even a third make Formulæ on page 225

Probably the culprit for the early failures was not the *developer. In photography as in all games of skill, you must* first "get your eye in," and you cannot do this if you are constantly changing your apparatus

For negatives use the same acid fixing bath as was used for fixing prints and enlargements, but in a slightly more dilute solution.

A Thermometer Essential

A thermometer is an essential part of your equipment for developing All the times prescribed presuppose a temperature of 64 degrees F (18 degrees C.) Even a few degrees more or less make a difference If the developer is too cold it slows up the developing process and if it is too warm it attacks the emulsion too quickly The result in both cases is bad

The Finished Negative

The negative cannot be judged accurately until it is quite dry. It should be examined by holding it up against the light. A moderately powerful magnifying glass (x3 to x6) will enable you to judge sharpness and grain. The so-called "Linen counter" will serve the purpose best.

The dense parts on the negative, representing as they do the bright portions of the original, are referred to as *high-lights* and the light parts are known as *shadows*, since they represent the dark spots of the real object.

The "Normal" Negative

In what are known as normal negatives these shadows should show detail, and should not be as clear as glass. The high-lights, on the other hand, should be sufficiently dense without being solidly black. They should show every gradation from grey to black. A well-balanced negative of this kind does not usually appeal to the unpractised eye of the amateur. Yet, on normal paper, it will produce excellent prints without any trouble, and on hard paper, vigorous enlargements. Its detail shadows show that it has been fully exposed, and the well-graded high-lights point to correct development.

Under-exposed

Hard negatives show violent contrast between the light parts and the shadows. There are two kinds of hard negatives. If the shadows are completely transparent and devoid of detail it is a case of under-exposure. Either the exposure was too short or the aperture too small. There is nothing to be done with a negative of this kind except to consign it to the dust-bin before it has a chance of spoiling a perfectly good sheet of printing paper with a very poor print.

Over-developed

If, on the other hand, there is detail present in the shadows, the trouble is due to over-development In this case the hard negative can be saved A soft paper in the printing frame or a normal paper in the enlarger will produce positives in which the violent contrasts are considerably toned down Besides this, the excess of density can be reduced by treating the negative with *Farmer's Reducer*, formula, see page 226. And yet a third way out is to make a less contrasty negative by means of a *direct duplicate film*

Over-exposed

The weak negative shows lack of contrast between shadows and light. If the shadows are veiled and perhaps heavily covered at the same time, it is a case of over-exposure Either the shutter remained open too long, or the aperture was too big Negatives of this kind are by no means lost If they are to be printed the time allowed must be considerably longer than for normal negatives, to allow the light to penetrate the dense covering But for enlargements the time becomes so unbearably long that it is better to reduce the film in *Farmer's Reducer* first, formula on page 226 Or else, as before a copy can be made on a direct duplicate film

Development too Short

If the weak negative is too thinly covered, even in the light parts then it has either been removed too soon from the developing bath, or else the developer was too cold and could not have its full effect in the given time Such negatives must be printed or enlarged on hard paper This means enlargements with coarse grain Here again a copy can be made on direct duplicate film There are also intensifiers which improve the density of the film but which unfortunately emphasise the grain at the same time

Chemicals

It is no doubt a most amusing pastime to mix your own developer according to a new formula in the hope of hitting upon some marvellous new product Alas ! you are wasting your time So leave experiments of this kind to the experts in their laboratories, and stick to the well tested formulae on page 225 unless you prefer to buy the well-known Brand-developers

Special note regarding formulae The "potassium" variety of chemicals may safely be substituted by the "sodium" A 10% increase in quantity is recommended For example to make up the fixing bath (page 226) instead of 25 grm of "potassium metabisulphite" 28 grm of "sodium meta-bisulphite" should be used to give the same results

Even though you do not go in for photography on a big scale, you will have a certain number of bottles on your shelf developer for films, developer for prints, fixing solution of two kinds So to avoid disaster label each bottle clearly

Developer stains on coloured material are almost impossible to remove Even white material is very difficult to clean once it is stained with developer The moral is, therefore, to wear old clothes or an efficient overall, so that the question of cleaning your good clothes never arises

Fixing salts this light, white substance, in powder or crystals can be the plague of the dark-room unless you handle it very carefully It will get into your developer and spoil your prints So keep your hands free from it

Instead of performing miracles of legerdemain by pouring developer, etc , from a dish back into a narrow necked bottle, why not buy a glass funnel ? It really makes things much simpler

To remove deposit from trays bottles etc use a two per cent solution of hydrochloric acid

Brand-developers in powder form consist of two separate powders These should be dissolved separately in a small

amount of water and then added together, and made up to the correct volume by the addition of more water

Developer kept in a half filled bottle deteriorates on account of the air, or rather the oxygen, with which it comes into contact One way of filling up this unwanted air space is to drop glass marbles into the bottle This is an old wrinkle which usually has only one drawback namely the scarcity of glass marbles

Another idea is as follows When the developer has been poured back into the bottle, suspend half a lighted match in the air space above the surface of the fluid by means of a piece of thin wire passed through the neck of the bottle As soon as the match goes out push in the cork The idea, of course, is to use up the oxygen present inside the bottle The match must not be allowed to fall into the developer

Do not put the fixing salt into the tray and pour water on to it If you do, it will form hard lumps First pour your water in and shake the salt into it gradually, stirring to help the dissolution

Do not try to revive a fixing bath by adding more salts Throw away the used solution and make a fresh supply

In 1 litre (20 ozs) of fixing bath 25 miniature film strips of 36 exposures (24 × 36 mm — 1 × 1½") or 30 3¼ × 2¼" (6 × 9 cm) films of 8 exposures may be safely fixed

Developing

Most developers can be used more than once, provided they are kept in well-corked bottles filled if possible to the top The time allowed for development must be lengthened for the second or third time of using in accordance with the instructions on the packet or bottle

If you carefully warm your developer up to 64 degrees F (18 degrees C) and then pour it into an ice-cold developing dish it is hardly surprising that the temperature of the liquid will fall with the result that the negative will not get fully developed in the time allowed So bring the developer up to at

least 68 degrees F (20 degrees C) first of all and after pouring it into the dish, wait until it has settled down to the right degree of warmth

To keep the bath at the correct heat it is a good idea to warm a brick or a tile in the oven to serve as a warm plate underneath the tray It can be removed or put back as required An electric hot plate is, of course, even handier

Metal developing tanks lose heat very quickly in a cold room To prevent this, wrap the tank up in an old towel during the developing process

Ten or even fifteen minutes is a long time to wait So while your films are "cooking" inside the pot you might as well pass the time as pleasantly as possible You merely have to put your alarm clock on the table and set it to go off at the right moment You can then read your paper in peace and the time will pass like a dream But agitate the tank periodically

A few drops of acetic acid added to the rinsing bath between developing and fixing will stop further development and prevent the transference of traces of developer to the fixing bath, and all the ills which arise therefrom

Your Negatives

A contrasty negative is by no means the same thing as a sharp one Yet many people persist in confusing the two A negative with strong high lights and empty shadows proves to be less promising than it looked at first sight

In the print or still more, the enlargement, its failings become apparent If the printing time is short the high lights are chalky and flat If the time is lengthened the missing details appear in the high lights, but the shadows are one unrelieved black mass Much better a well balanced negative in which neither light nor shade is over emphasised

Of all the once popular reducing and intensifying agents the only one which does not deserve to be consigned to oblivion is Farmer's Reducer A negative which is too densely covered is immersed in the reducing bath until it has been sufficiently

reduced. After washing and drying, the negative will give a good enlargement in a few seconds instead of, as formerly, in as many minutes

Farmer's Reducer can be used for improving hard negatives, provided the defect is due to over-development and not to under-exposure

Chemical treatment of an unsatisfactory negative has many drawbacks, even if that most innocent of preparations, namely, Farmer's Solution, is the one used Nowadays it is very simple to make a copy of your negative, but without the faults of the original With the help of a direct duplicate film you can "print" another negative, just as you would print a positive paper print

If your original negative is too dense, you will need a longer printing time to give you your thinner duplicate With a negative that is too thin, on the other hand, a short printing will give a thicker duplicate A hard negative, with medium exposure to light and a short development, will give a softer duplicate, and a weak negative, with the same exposure and a longer development, will produce a more vigorous copy Duplicate films are developed in yellow light according to the usual procedure develop, fix, wash, and so on

One great advantage of this method is that should a mistake occur, the loss is confined to the copy, which can easily be replaced, leaving the original unaffected

The fact that the duplicate film is a mirror image of the original is not a serious matter The inversion is corrected in enlarging by putting the film upside down in the apparatus, that is with the emulsion side towards the light For printing, the smooth side of the film must be in contact with the sensitive side of the printing paper As duplicate film is very thin, there will be no distortion

If a drop of water falls on the emulsion side of the dry film or plate, the negative must be soaked completely in water and dried all over again Otherwise a mark remains which shows up on the enlargement.

Scratched negatives can be treated with Resistol which makes small scratches completely invisible and does its best even with more serious ones It also protects the emulsion from subsequent rough handling

If the water used in the dark room is very hard, it sometimes leaves a white, powdery deposit on negatives This can be dissolved away by putting the film after washing in a two per cent solution of acetic acid

Film negatives should not be left in the strip The constant rolling and unrolling will wear them out They should be cut into single exposures and the good ones stored in a proper negative holder, while the bad ones should be thrown into the dust bin where they belong Miniature films should be cut in strips of four and stored in special wallets

A USEFUL TABLE

SAFELIGHTS FOR THE DARK ROOM

It is not enough to have any piece of red glass in your dark room lamp The road mender s lamp looks red but it lets through all sorts of other light rays. So be quite sure that any glass you use really lets nothing through which can influence the emulsion of your film The same thing applies to safelights of any colour

DARK GREEN for pan material Lighting must be indirect—reflected from the ceiling for example Time-development in the dark is preferable.

DARK RED for ortho films and enlargements. Experience needed to estimate development of paper prints correctly

ORANGE for contact prints and enlargements

LIGHT GREEN ditto But only with indirect lighting Gives a bright light and is therefore more useful than orange or red

YELLOW for contact papers Not essential provided developer tray is shaded and fixing bath covered with cardboard

Tank Developer

Pyrocatechin ...	35 *gr*	4 *grm*
Sodium sulphite (anhydrous) ..	88 *gr*	10 *grm*
Sodium carbonate (anhydrous) .	88 *gr*	10 *grm*
Water to .	20 *fluid oz*	1,000 *ccm*

The solution above should be used without dilution and requires between 25 and 40 minutes to produce a soft negative

It may be used with great success for time development in developing tanks of the kind commonly marketed During the process of development, the developer must be agitated every five minutes by rotating or rocking the tank.

For Soft Results

Metol .	131 *gr.*	15 *grm*
Sodium sulphite (anhydrous)	1 *oz*	50 *grm*
Sodium carbonate (anhydrous)	1 *oz*	50 *grm*
Potassium bromide	9 *gr*	1 *grm*
Water to	20 *fluid oz*	1 000 *ccm*

For use, the developer should be diluted with twice its own volume of water for very fast films and plates, and with four volumes of water for all those emulsions which tend to give hard negatives, such as fine-grain films

The development time should be about 6 minutes

For Contrast

(A)

Sodium sulphite (anhydrous)	1 *oz*	50 *grm*
Hydroquinone	220 *gr*	25 *grm*
Potassium bromide	220 *gr*	25 *grm*
Water to	20 *fluid oz*	1,000 *ccm*

(B)

Caustic soda (stick)	220 *gr*	25 *grm*
Water to	20 *fluid oz*	1,000 *ccm.*

The working developer is made by mixing equal parts of (*A*) and (*B*) just before use The solution should not be allowed to touch the fingers Plate or film clips, or rubber gloves, are required

The time of development should not exceed 4 minutes, and since the mixed developer does not keep well, it must be thrown away after use

Fine Grain Developer

Metol	18 gr	2 grm
Sodium sulphite (anhydrous)	2 oz	100 grm
Hydroquinone	44 gr	5 grm
Borax	18 gr	2 grm
Water to	20 fluid oz	1,000 ccm

The metol is first dissolved in about 2 fluid oz (100 ccm) of water at 95 105°F (35-40°C) and the solution placed in a bottle or flask The sulphite is then dissolved in small quantities of 10 fluid oz (500 ccm) of water at the same temperature When it has dissolved, the borax is added and the solution added to that of the metol The hydroquinone is then dissolved in about 4 fluid oz (200 ccm) of water and also added to the rest After cooling to room temperature the bottle or flask is filled up to full volume

The solution (the formula is due to Kodak) is used undiluted and, since it is only very weakly alkaline it works slowly and gives soft contrast The ordinary fast films and plates of to-day require some 15 minutes development in it, while a true fine-grain emulsion needs only between 8 and 10 minutes In order to be able to develop such fine grained negatives to soft contrast It is useful to give twice normal exposure

Fixing-Bath

Hypo (sodium thiosulphate)	4 oz	200 grm
Potassium metabisulphite	½ oz	25 grm
Water up to	20 oz	1 600 ccm

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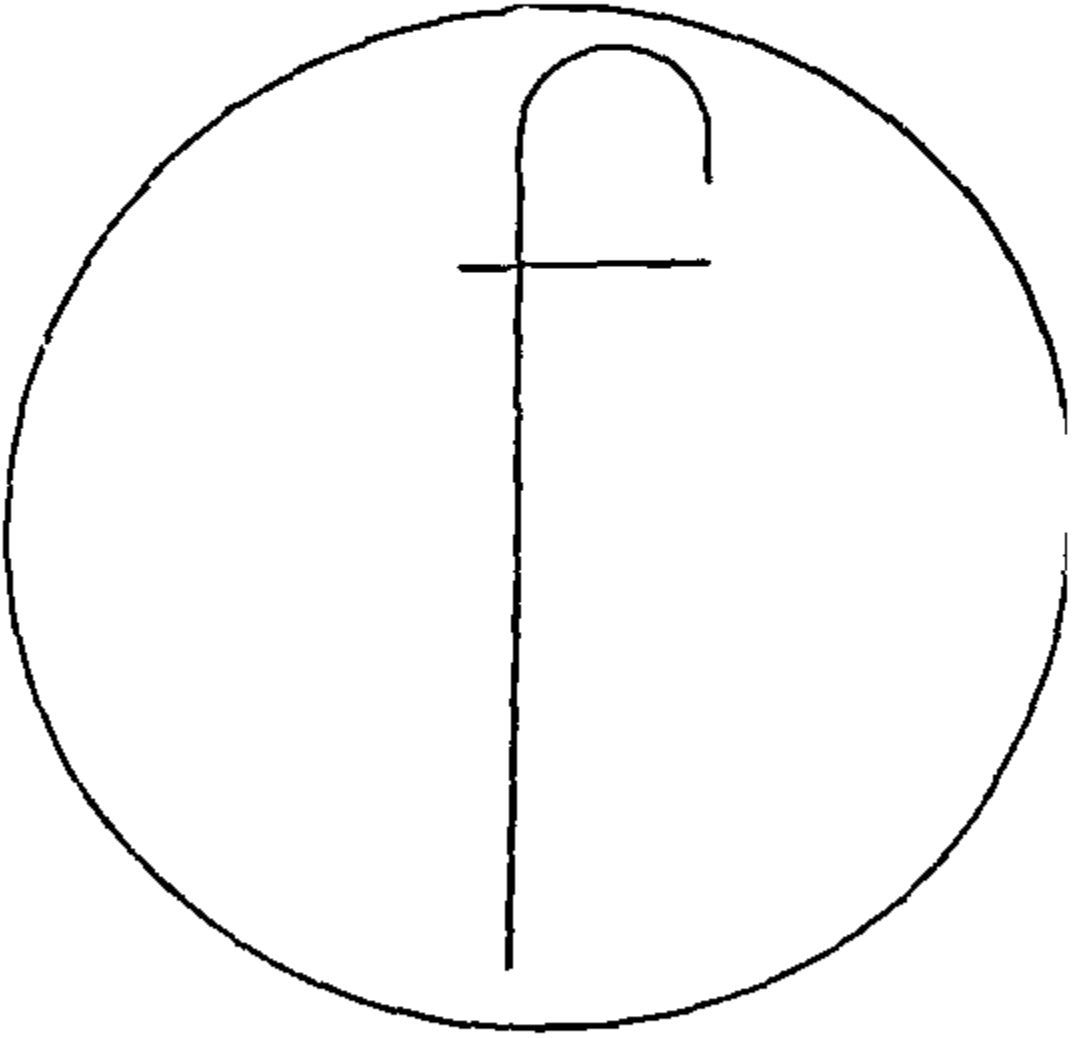

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